

Miscellaneous Notes on Hymenoptera.

With Descriptions of New Genera and Species.

BY JOHN COLBURN BRIDWELL.

1. HYMENOPTEROUS LARVAE WITH FALCATE MANDIBLES.

Mr. C. E. Pemberton in his recent work on the life-histories of the fruit fly parasites has found that the Opiine Braconids and the Diapriid *Galesus Silvestrii* have the first larval stage provided with long falcate mandibles which are used to destroy other larvae in the same host. He has also in unpublished studies on the life-history of the parasite of the *Lantana* Agromyzid described in another paper in this issue as *Opius lantanae* found the same type of first stage larva. Oglobin found the same type of larva in the Coccinellid Braconid *Dinacampus terminatus* (Nees). I have found the same type in the Bruchid parasite *Heterospilus prosopidis* ^{Viereck} Crawford and Graenicher has found a similar larva in some of the parasitic bees.

On the other hand Pemberton and Willard in studies of the external parasite of lepidopterous larvae here described as *Microbracon Pembertoni* have found an entirely different type of first instar larva. The first stage larva of *Aphycus*, *Perilampus*, *Tetrastichus*, *Scutellista*, and many other Chalcidoid parasites are very different.

What then is the significance of the falcate mandibles? Are they phylogenetic in significance or adaptive? The latter seems to be the case and we may perhaps safely generalize in this way. Certain species of parasitic Hymenoptera where the prey or host is concealed and successive parasitization is probable have independently developed the long falcate mandibles which give a means for one larva to destroy the other. At any rate in the cases studied one larva alone reaches maturity and in the case of some at least in which the mandibles are not so developed more than one parasite can reach maturity upon a single host.

ICHNEUMONIDAE.

2. NOTES ON SOME SPECIES OF ECHTHROMORPHA IN THE COLLECTION OF THE HAWAIIAN SUGAR PLANTERS' ASSOCIATION.

Echthromorpha maxima Krieger.

1 ♀ Piroe, Ceram. (F. Muir.)

Length 27 mm.; antennae 22 mm.; wing 23 mm.; ovipositor 14 mm.; about as long as the abdomen.

In the long ovipositor, short face and malar space and the somewhat humped first tergite, this species approaches the genus *Glyptogastra* Ashmead.

Echthromorpha notulatoria (Fabricius)

1 ♂ Loo Fou Chan, China. (F. Muir.)

Echthromorpha insidiator (Smith).

1 ♀ Amboina. (F. Muir.)

Echthromorpha immaculata Krieger 1908.*Echthromorpha diversor* Morley 1913.

1 ♀ 4 ♂ Rewa, Viti Levu, Fiji Islands. (F. Muir.)

The ♀ has not been previously described.

Length 13 mm.; wing 11 mm.; abdomen 8 mm.; ovipositor 4 mm.

Antennae 32 jointed, about as long as the body, fourth joint not quite as long as the fifth and sixth together, remaining joints successively shorter to the penultimate, which is a little longer than broad, ultimate joint a little longer. Head yellow, somewhat suffused with reddish, eyes dark, front and occiput blackish, scape yellow, antennae reddish. Head somewhat shining with a few uneven and irregular shallow punctures.

Prothorax and mesonotum largely reddish, varied with yellow, a broad longitudinal median band on the mesonotum suffused with black, mesopleura and mesosternum, sides of propodeum and a suffused median longitudinal band on its declivity black; elevation beneath the wings, disc of scutellum and metanotum, suffused area on either side the apex of the propodeum yellow with more or less reddish surrounding. Mesonotum dullish with shallow oblique punctures more or less disposed in median and parapsidal groups, mesopleurae above smooth and shining, below and

in front somewhat coarsely punctured on a shining ground, propodeum somewhat punctured and transversely striate above the stigmata.

Abdomen with tergites 2-4 black, remainder reddish, a yellow spot on either side the apex of the first tergite; tergum smooth and highly polished with some scattered punctures, somewhat more punctate laterally.

Legs yellowish, hind and middle tibiae more or less reddish. Wings yellowish hyaline, the nervures brown.

Mr. Timberlake who has checked over the description of *E. immaculata* and *E. diversor* agrees in synonymizing Morley's species.

***Echthromorpha fuscator* (Fabricius).**

While on the subject of *Echthromorpha* it may be noted that after diligent efforts to find females corresponding to the ♂ described by Cameron as *flavo-orbitalis* I have never taken or seen a female with yellow orbits. Males with the characters of *flavo-orbitalis* Cameron are not uncommon among the smaller individuals. I am convinced that *flavo-orbitalis* is only a weak color variety of *fuscator* (*maculipennis* Holmgren) connected by intermediates with the larger normal form. The species is abundant at all elevations in the Hawaiian Islands, attacking numerous species of endemic and immigrant lepidoptera.

3. **GLYPTOGASTRA** Ashmead.

It is curious that *Echthromorpha fuscator* (Fabr.) should be so common and adaptable to various endemic and immigrant hosts while its allies in *Glyptogastra* remain rare.

***Glyptogastra Ashmeadi* Perkins.**

Has only been taken in the Koolau Range of Oahu at elevations of 1500-1800 feet and always singly. Probably not more than a dozen specimens at the outside have ever been taken but they may be more common than seems, for in flight they very much resemble the omnipresent *Echthromorpha*.

The ♀ has never been described. It resembles the ♂. The mouth parts, edge of clypeus antennae, legs from the trochanters on suffused edges of the tergites and two or three ultimate tergites reddish, rest of body bronze, wings dusky hyaline.

Length 11 mm.; wings 9 mm.; abdomen 7 mm.; ovipositor 1 mm.
Antennae about as long as the body.

***Glyptogastra hawaiiensis* Ashmead.**

A single ♂ specimen of *Glyptogastra* taken on the foliage of *Acacia koa* at Olinda, Maui, was at first supposed to represent a new species but having only ♀ of *Glyptogastra hawaiiensis* Ashmead for comparison the question remained unsettled. Another specimen in the Bishop museum from Mapi is somewhat intermediate in the supposed differentiating characters. I believe the species has not previously been reported as occurring on Maui.

Since writing the note above the examination of three ♂ *Glyptogastra hawaiiensis* taken by Mr. W. M. Giffard, one from Iao Valley, Maui, March 6, 1909, and two from Kilauea, Hawaii, 1911 and 1912, make the reference of the Maui specimens to this species certain. The single ♀ known to be in the collections in the Islands is in the collection of the Hawaiian Sugar Planters' Association and was taken by the late F. W. Terry in the koa forest at Kilauea, Hawaii, June 3, 1905.

The more metallic coloration of *Ashmeadi* with the reddish bands of the abdomen make it easily distinguishable from *hawaiiensis*.

4. **AMBLYTELES KOEBELEI** (Swezey).

I had always supposed that *Ichneumons* parasitized the pupae of lepidoptera but an observation made June 16, 1918, upon this species showed a different procedure. While coming down near the base of one of the ridges of the Waianae Mountains above Waipahu, Oahu, at about 3 p. m., a large, full-fed cutworm was observed in violent contortions on the ground. Upon examination it was found that it was being attacked by a large ichneumon which was stinging it in various places. It

was so intent upon this that it permitted me to pick it up by the wings and it held its grip so strongly that the cutworm was lifted with it. Both were placed in a tube and this plugged with cotton but unfortunately both ichneumon and cutworm escaped through the cotton plug which had been made too loose to retain them.

Mr. Swezey informs me that this must be the normal method of attack for this species since the cutworms from the pupae of which it has been bred are usually subterranean. The cutworms emerge from shelter in the late afternoon preparatory to feeding and it is at this time which the *Amblyteles* has been observed most active on the wing.

Mr. Timberlake, who has examined this species, places it in *Amblyteles*. It was described as an *Ichneumon*.

BRACONIDAE.

5. HAWAIIAN VIPIONINE (FORMERLY BRACONINÆ) BRACONIDAE.

1. Second abscissa of radius shorter than the 1st transverse cubitus, propodeum and abdomen neither entirely smooth nor distinctly sculptured, being microscopically shagreened, coloration exceedingly variable, sometimes entirely reddish yellow, except the eyes and antennae, thorax and abdomen usually largely black; ♀ antennae 14-15 jointed, rather short and stout, ovipositor shorter than abdomen; a common parasite of *Ephestia elutella*, etc.

..... **Habrobracon hebetor* (Say)

Second abscissa of radius longer than the 1st transverse cubitus, ♀ antennae more than 14 jointed, slender.... 2

* I have seen a single specimen, possibly another species, in which the antennae are 12 jointed, the thorax and abdomen black and there are black markings on the head.

2. Head, thorax, and abdomen highly polished and shining, black, abdomen and legs in part yellowish, ovipositor about as long as head, thorax and abdomen together, a parasite of *Tephritis* in *Bidens*
Microbracon Terryi Bridwell
 Head and thorax not entirely black, ovipositor elongate in only one predominantly red species..... 3
3. Predominantly red, thorax highly polished and shining, abdomen rugulose, ovipositor about as long as abdomen and thorax.....*Microbracon Pembertoni* n. sp.
 Ovipositor not longer than abdomen; if predominantly reddish, the propodeum rugulose 4
4. Thorax black except the parapsidal marks, these with radiating silvery hairs on their margins; abdomen smooth with copious silvery hairs.....
Microbracon omiodivorum (Terry)
 Head, thorax and abdomen predominantly reddish yellow, abdomen rugulose with only a few feeble hairs
Microbracon Swezeyi n. sp.
 All the species are immigrants into the Hawaiian Islands.

Microbracon Terryi Bridwell.

Described in a subsequent paper in this number.

Microbracon omiodivorum (Terry).

Macrodyctium omiodivorum Terry.

Expt. Sta. Hawn. Sugar Planters' Assoc. Div. Ent.

Bull. 5:37 ♀ ♂ Hawaii 1907.

Bracon omiodivorum Perkins.

Fauna Hawaiiensis 1:cxi. 1913.

The material studied by Terry is present in the collection of the Hawaiian Sugar Planters' Association. It consists of 14 ♀ ♀ and 14 ♂ ♂ taken from 1905 to 1907 and includes individuals from Hawaii, Maui, Oahu and Kauai. These have

been labelled as *Cotypes*. There are also in this collection two individuals taken by Mr. Terry at Hong Kong. Mr. Swezey has published the opinion that this species was introduced into the Islands from Japan by Mr. Koebele and has recorded it as breeding upon *Nacoleia accepta* (Butler), *N. Blackburni* (Butler), *Hymenia recurvalis* (Fabricius) and *Archips postvittanus* (Walker), all leaf rolling Lepidoptera.

***Microbracon Pemberton* n. sp.**

Bräcon sp. Swezey. Proc. Haw. Ent. Soc. 3:109.
(Last entry so headed). 1915.

♀. Red; tips of mandibles, palpi more or less, antennae, eyes, ocelli, propodeum more or less (often only very slightly, at the insertion of the abdomen), ovipositor sheaths, tarsi and apex of hind femora more or less, black or blackish. Wings fuscous subhyaline, nervures the same except that the costa basally is reddish and the stigma is yellow.

Head and thorax highly polished and shining; the tergites rugulose, the connate second and third tergites more coarsely so. Suture of the second and third tergites crenulate; suture between the third and fourth (free) tergites smooth, a sulcus there but indefinite behind.

Antennae about 40-jointed, about as long as the body, ovipositor about three-fourths as long as the head, thorax, and abdomen together.

Length about 4 mm.; wings 5 mm.; ovipositor 3 mm.

♂. Similar to the female but smaller.

Described from 24 ♀♀ and 22 ♂♂ collected or bred on the island of Oahu, the earliest record being in April, 1914.

Type ♀ and allotype ♂ in the collection of the Hawaiian Entomological Society, paratypes in the U. S. National Museum, in the collection of the Hawaiian Sugar Planters' Association and in the private collections of P. H. Timberlake and of the author.

It has been bred from berries of *Lantana camara*, probably from the larva of *Crociosema lantanae* by O. H. Swezey and J. C. Bridwell, from *Pectinophora gossypiella* by D. T. Fullaway, C. E. Pemberton, and H. F. Willard, and from *Myelois ceratoniae* and *Cryptophlebia illepidia* the former in pods of *Acacia farnesiana*, the latter in the same and in the pods of *Acacia koa* (J. C. Bridwell).

The species is named for C. E. Pemberton, whose studies of the biology of the parasites of fruitflies have been of unusual interest. He began studies of the life history of this species which have been continued by H. F. Willard. To Mr. Willard I am indebted for a series of specimens of this species bred from *Pectinophora gossypiella* in the course of his studies upon the species.

Since writing the description above Mr. Willard has shown me specimens used in refrigerator experiments in which the mesosternum is largely black.

Microbracon Swezeyi, n. sp.

Bracon sp. and *Bracon* sp.? Swezey. Proc. Haw. Ent. Soc. 3:109. 1915.

♀. Yellow, tips of mandibles, ^{eyes}~~edges~~, ocelli, antennae, ovipositor sheaths, unguis and apex of last tarsal joint black or blackish, head more or less piceous, propodeum and 1st and 2nd tergites suffused with fuscous sometimes pale, wings grayish hyaline, the nervures colorless, very translucent, the second transverse cubital nervure obsolete.

Head and thorax highly polished, smooth and shining; propodeum reticulorugose, the spaces round but hardly punctiform, a crenulate line down its middle; abdomen rugulose, tergites 1-3 longitudinally, the following transversely and more finely rugulose; furrow between the first and second tergites smooth narrowly interrupted in the middle; furrow between the connate second and third tergites crenulate, tergites 4, 5 and 6 contracted at base, hardly furrowed.

Antennae about 36-jointed, not as long as the head, thorax and abdomen together; ovipositor short, not more than half the length of the abdomen.

Length 3.5 mm.; wing 3 mm.; ovipositor .75 mm. These are the measurements of the type. The other ♀♀ are considerably smaller.

♂ Similar, the abdomen very slender.

Described from 1 ♀ (the type) bred by O. H. Swezey from *Bactra straminea* (Butler), Jan. 7, 1913, 4 ♀ and 2 ♂ bred from *Batrachedra curvicauda* Busck May 4, 1914, Lepidoptera whose larvae feed in the brackish-marsh sedges in the Kewalo district of Honolulu. I have also 1 ♀ taken at Wai-kiki in 1917, and 6 ♀ and 2 ♂ taken in the marshes there May 30, 1919 (Bridwell).

Type ♀ and allotype ♂ in the collection of the Hawaiian Entomological Society, paratypes in the collection of the Hawaiian Sugar Planters' Association, in the U. S. National Museum, and in the author's collection.

Named for Mr. Swezey, who first bred this little species, as he has so many of the immigrant parasites.

ALIENIDAE.

6. A PECULIAR WINGLESS HYMENOPTERON FORMING THE TYPE OF A NEW GENUS AND FAMILY.

The apterous insect described below is so peculiar that it will not fall into any of the families at present recognized, and rather than alter the limits of some recognizable family to include this highly anomalous form it has seemed better to erect for it a family of its own ALIENIDAE. Even so it remains doubtful in what superfamily this genus should find place.

ALIENUS n. gen.

Head slightly broader than the thorax and abdomen, quadrate in the dorsal aspect, declivous in front and prolonged into a short snout in front of the large oval faceted eyes which occupy the greater part of the sides of the head. Face concave for the insertion of the antennae and coarsely obliquely striate. Antennae inserted just in front of the mouth near the mandibles which are small nearly straight and conical without teeth, malar space longer than broad; mouth cavity small, triangular, margined, anterior to the eyes, no evident gular cavity or suture, ocelli moderate, arranged in an acute triangle, the posterior pair adjacent to the inner orbits and considerably more than their distance apart before the occipital margin, occiput finely margined. Antennae filiform, 13-jointed, strongly geniculate, scape subcylindrical elongate, a little thicker toward the base, flattened on the side next the flagellum, about as long as the pedicel and first three flagellar joints not quite attaining the level of the anterior ocellus, pedicel elongate, half as long as the first flagellar joint, second and following joints successively shorter, the last five each about as long as broad, the last joint about as long as broad and narrower and rounded at apex.

Pronotum loosely articulated with the mesonotum, quadrate, massive, truncate in front and slightly arcuately emarginate behind with

the lateral angles a little prolonged, a little narrower than the mesonotum and about as long as the mesonotum and scutellum together; propleura and prosternum loosely articulated with the pronotum; prosternum small, transverse, bounded laterally and in front by the propleura which meet broadly below, above they are separated by a small free cervical sclerite.

Mesonotum slightly convex transversely, transverse slightly arcuate behind, laterally finely margined, scutellum transverse a little narrower and shorter than the mesonotum and separated from it by a straight simple furrow which does not attain the lateral margins, impressed obliquely at either side at the end of this furrow.

Propodeum quadrate, narrower than the pronotum, slightly transversely convex in the same plane with the mesonotum, separated from it by a shallow furrow, bounded posteriorly by a fine line similar to the transverse striations of its surface, the declivity transversely rounded but exactly vertical as seen from the side.

Mesopleura convex depressed beneath the ridge formed by the projecting margin of the mesonotum, a curved foveolate furrow leading up to the posterior margin of the mesonotum from the round pit just above the middle coxae, sides of propodeum concave.

Legs rather slender, not at all spinose, all the coxae contiguous, the femora slightly thickened, the anterior and posterior more so than the middle femora, hind trochanters two jointed; front and middle femora about as long as their tibiae, the hind tibiae longer than their femora; calcaria feeble 1, 2, 1, calcaria of the middle legs unequal, hind calcaria curved, basitarsi slender elongate, a little shorter than their tibiae and about as long as joints 2-5 of the tarsi, all the joints sub-cylindrical, unguis small.

Abdomen oval, slightly broader than the mesonotum, convex above and beneath with four visible tergites and sternites; tergites 1 and 2 subequal, occupying the greater part of the tergum, sternite 1 emarginate behind much smaller than 2 which occupies the greater portion of the venter, other sternites and tergites transverse, the tergites and sternites are simple, without depressed margins or other special structures except that tergite 1 has a feeble imperfect elevated line at the edge of the declivity. Type *Alienus aenigmaticus* Bridwell.

***Alienus aenigmaticus* n. sp.**

Sex, indeterminate.

Black, the vertex and face with dark bronzy greenish metallic reflections, pedicel and 1st and 2nd flagellar joints and legs, from the coxae on, yellowish testaceous.

Concavity of face shining, coarsely transversely striate with the ends of the striae directed downward, above these some striae parallel to the orbits, vertex smooth and shining finely and sparsely punctate, a shallow depressed space on the vertex behind the ocelli; pronotum with

shallow scattered punctures the integument between microscopically lineolate, shining, mesonotum and scutellum much the same, propodeum finely transversely striatorugulose with a smooth posterior narrow band separating the upper face from the somewhat more distinct transverse striae of the declivity; mesopleura shining with rather coarse scattered punctures, sides of propodeum smooth and shining with some longitudinal striae on the lower part of the concavity. Hind coxae outwardly transversely striate.

Abdomen minutely transversely lineolate with feebly indicated shallow scattered punctures.

Length 3.3 mm.; width of head .8 mm.

One individual found running on the ground, Mowbray Golf Links, Capetown, South Africa, April, 1915 (J. C. Bridwell).

Type in the author's collection.

Affinities. The form of the head and insertion of the antennae on the extreme anterior margin of the head seem to show affinity with the Ceraphronidae but the form of the prothorax and the 13 jointed antennae seem to forbid association with them. The form of the head and mandibles, the long scape and pedicel, the slender legs and four segmented abdomen forbid association with the Bethyilidae, Embolemyidae and Dryinidae, the short hind coxae forbid association with the Psammocharidae. The absence of a basal constriction of the abdomen and many other characters forbid association with other families of the Scolioidea. On the whole, this insect would seem to fall in the Serphoidea but for the present it seems better to consider it as the monotypic representative of a family Alienidae rather than to modify any of the existing families for its reception.

TIPHIIDAE.

7. EPIMODIOPTERON Romand.

Scoliphia Banks Can. Ent. 44:201. 1912.

Epimodipteron spilota (Banks). Arizona.

I have seen specimens of this species from the Stanford University collection collected by W. M. Mann in Arizona

through the kindness of Prof. Vernon Kellogg. I can find no important differences between Banks' genus and *Epimodipteron*.

8. PARATIPHIA.

It seems very doubtful if this genus can be maintained since extra-American species are found which present singly two of the three characters by which the genus is separated from *Tiphia*. The first abdominal segment may be carinate without the white clypeus of the ♂, while the venation is normal for *Tiphia*, or the venation may be like *Paratiphia* and the other characters like *Tiphia*.

EUMENIDAE.

9. WHAT IS ABISPA AUSTRALIANA Mitchell?

The late Mr. Meade Waldo (Ann. Mag. Nat. Hist. (8) 14:461, 1914) synonymized Mitchell's genus *Abispa* with *Polistes*, reviving Saussure's *Monerobia* for this interesting genus of Australian Eumenidae. That this course should not be followed was my conclusion after examination of Mitchell's work, and the two Hymenoptera involved in the question.

Mitchell's Journals of 1831-2 were prepared for publication in 1838, seven years after Mr. Mitchell and his friend were stung by the ferocious *Polistes tepidus*. It is evident that the description was drawn up at the latter date and from this description it is easy to see that the great explorer was far from being familiar with entomological terms. If one compares the description of the insect which he gives with *Polistes tepidus* and Smith's *Abispa australis* it seems perfectly clear that, in the seven years intervening between his expedition and the publication of his Journals that he had become confused as to the identity of his assailant and described the largest and most ferocious-looking of the wasps he had collected under the influence of this confusion.

Since the original description is not readily accessible to entomologists its reproduction is desirable. It is found as a

footnote on page 104 of volume one of his Three Expeditions into the Interior of Eastern Australia and reads as follows: Genus, *VESPA*; subgenus, *ABISPA*; species *Abispa Australiana* (mihi).

Head, antennae, and feet yellow; eyes black; the scutellum of prothorax yellow; the scutum of mesothorax black; with the scutellum yellow; the scutum of the metathorax yellow, with the scutellum black and the axillae yellow. The wings yellow, with dusky tips. The first segment of abdomen has the petiole black. The second segment is black and the rest yellow.

It is clear that the interpreting "the scutellum of the prothorax" as the pronotum, "scutum of metathorax" as the metanotum, "scutellum" of the same as the superior face of the propodeum, and the "axillae" as the posterior lateral angles of the propodeum and allowing a little inaccuracy in the statement that the second abdominal segment is black, we have a reasonably close description of *Abispa australis* Smith.

It is especially to be noted that Mitchell does not use the name in the text.

It seems clear that the stinging insect mentioned in the text is *Polistes tepidus* (Fabricius), but it seems equally clear that the insect described in the footnote is *Abispa australis* Smith and that accordingly we must retain the name *Abispa* for the genus of Australian Eumenid wasps in preference to Saussure's *Monerobia*.

In Della Torre's Catalogue an error has crept in in citing *Abispa ephippium* Mitchell. There is no such combination to be found in the work indicated. Smith has given the same erroneous reference. Both are doubtless based on Saussure's supposition that *australiana* is identical with *ephippium*. There is, however, no reason to suppose this is the case.

The synonymy then may read:

Abispa Mitchell 1838.

==(*Monerobia* Saussure) 1852.

==(*Polistes* Meade Waldo) 1914 nec Latreille.

Type *Vespa* (*Abispa*) *australiana* Mitchell 1838. Monobasic.

Abispa australiana Mitchell 1838.

=(*Abispa australis* Smith).

Cat. Hym. Brit. Mus. 5:42. 1857.

These notes were based upon material kindly placed at my disposal for study in the Queensland Museum in 1915.

10. *NESODYNERUS RUDOLPHI* (Dalla Torre).

On one of the outer ridges of the Waianae Mountains at an elevation of about a thousand feet are some exposed boulders. On a protected side of one of these, beneath which a projection made a suitable place for them were found on June 15, 1918, some mud nests of *Sceliphron cementarius*, some of the cells having in them pupae or tenerous adults. From others they had emerged and these were being utilized by *Odyneri* for their nesting places. One female *Nesodynerus Rudolphi* was taken within one of the cells, while others contained lepidopterous larvae brought there by the wasps. Two contained *Odynerus* larvae, one full fed and in the other were caterpillars as well. One contained a single egg, elliptical in outline about twice as long as broad and suspended by a thread not quite as long as the egg itself. These were brought in for study.

The caterpillars used for larval food were all those of *Amorbia emigratella* Busck which I found later feeding beneath a web on the flower shoots of *Dracaena*. The number employed could not well be made out on account of the breakage of the cells when they were removed from the rock, probably six or eight, however, were required for a single cell. Each cell of the *Sceliphron* was divided by an earthen partition and served for two cells of the *Odynerus*.

The larva which was still feeding, during the day and night since being brought in, had eaten all it cared for of two caterpillars. It sinks its head into the body of the caterpillars in front of the prolegs and feeds voraciously like a caterpillar upon the substance of the caterpillar within the skin, its mandibles being in constant motion. Two of these larvae were completely devoured and the third was half eaten.

The caterpillars were all in a living condition and moved slightly at their extremities when disturbed, but were incapable of locomotion.

The egg was found at about two o'clock June 15, 1918, and hatched June 18, but the larva died without feeding.

11. ODYNERUS PSEUDOCROMUS Perkins.

The nests of this species are made in the pith cavities of dead twigs and branches, the cells being separated by weak mud partitions. Usually from one to three cells are to be found in a place. One nest found on Mt. Lanihuli was stored with the larvae of the Ohia Tortricid (*Eccoptocera foeterivora* Butler). There were about a dozen of the larvae in one cell. The egg was near the bottom of the mass of larvae and was attached by a thread shorter than the egg.

TRYPOXYLONIDAE.

12. PISON IN THE HAWAIIAN ISLANDS.

The following table will serve to distinguish the three species of *Pison* which are now known to be established in the Hawaiian Islands:

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|----|--|--------------------------|
| 1. | First and second recurrent nervures interstitial with the 1st and 2nd transverse cubital nervures..... | |
| | | <i>iridipennis</i> Smith |
| | Second recurrent received by the second cubital cell..... | 2 |
| 2. | First recurrent interstitial with 1st transverse cubitus calcaria of hind tibiae pale..... | <i>argentatum</i> Smith |
| | First recurrent received by the first cubital cell. Calcaria of hind tibiae dark..... | <i>hospes</i> Perkins |

HYLAEIDAE.

13. SOME SEGREGATES FROM HYLAEUS.

The processes of type-fixation now under way involve a number of changes in nomenclature which are not greatly welcomed by many of us whose tendencies are conservative and in many cases type fixation results in obvious violation of the

wishes of the author of the genus. This has been the result particularly with the work of Fabricius where his carelessness in the inclusion of extraneous forms has resulted in such extraneous forms being made types of his genera. Such a case is that of *Prosopis* and *Hylaeus*. The type fixation here has not been recent but it has been disregarded until recently and the change of names so forced upon us is far from pleasant. But it seems to me that instead of grieving over our wounds and delaying the acceptance of necessary changes we should hasten the process of type fixation and be done with the whole unpleasant business. Recent investigations on my part of the status of several of the older names in the bees has thoroughly convinced me that no possible stability in nomenclature can be secured without a thoroughgoing acceptance of the principle of a single type for every genus and family. Such researches are entirely out of the reach of most of us who have not free and continuous access to the larger entomological libraries, and it is to be hoped that those who have such opportunity will hasten the completion of this work. More than this, it seems to me that the next revision of our nomenclatorial code should further clarify our rules regarding type fixation and an important addition made which would refuse to recognize any subsequently formed genera for which no type is established upon publication.

Hylaeus Fabricius, whatever the original intention of the author, (as has been recently called to our attention by Morice and Durrant) was fixed as the proper name for the bees which all more recent authors have called *Prosopis* when Latreille in 1802 fixed *Apis annulata* Linne as its type. Whether we accept the Elangen list or not, the type of *Prosopis* "Jurine" of that list (1801) is congeneric with the type of *Hylaeus* and that of *Prosopis* Fabricius (1804) is identical with that of *Hylaeus*. There is no escape then from sinking *Prosopis* and reviving *Hylaeus* even if Fabricius, as nearly as he ever came to recognizing genera, wished to make *Hylaeus*=*Halictus* and to give the name *Prosopis* to the bees so long known under that name.

However, before we transfer *en masse* the heterogeneous species described under *Prosopis* to *Hylaeus* it will be well to segregate some of the species into proper genera.

The following table will serve to distinguish some genera, described species of most of which have been placed in *Prosopis*. This work of segregation is far from complete. Certainly most of the Australian species described as *Prosopis* will not fall in any properly defined genus *Hylaeus*. Neither material at hand nor time permits an investigation of all the genera which should fall into the *Hylaeidae*.

TABLE OF SOME GENERA OF HYLAELIDAE.

1. Mandibles flattened at apex or tridentate or bidentate
in both sexes 2

Mandibles acute at apex, edentate, elongate, nearly straight, propodeum rugose, angulate at the sides and subcarinate, the triangular basal area well defined with its sculpture different from the rest of the propodeum, first recurrent nervure received by the first cubital cell or interstitial, the second interstitial with the second transverse cubitus or received *beyond* it, supra-clypeal area short, bounded by lateral carinae. Face broad, usually broader than long, clypeus trapezoidal, about as high as broad at its anterior margin, labrum triangular.

♂ Stipes greatly produced apically into a slender process nearly as far beyond the apices of the sagittae as their length, eighth sternite with a short rounded median process.

Coloration. Thorax black, frequently with yellow and ferruginous markings, legs and first segment of the abdomen usually more or less ferruginous *Nothylaeus* n. gen.

2. Mandibles bidentate at apex 4
Mandibles tridentate at apex
..... certain Australian "*Prosopis*"
Mandibles flattened at apex, not toothed 3
3. Mandibles not channelled, truncate at the apex, supra-clypeal area not angulate between the bases of the

antennae (evenly rounded down to the sockets).

..... *Gnathoprosopis* Perkins

Mandibles channelled outwardly as in *Hylaeus*, rounded at apex, sides of supraclypeal area ridged or angulate between the antennae *Gnathylaeus* n. gen.

4. Scutellum and metanotum normal.....*Hylaeus*, etc.

Scutellum and metanotum produced posteriorly on either side into a lateral laminate tooth or spine, superior face of propodeum areolate, separated from the posterior face by a carina, posterior face divided by a longitudinal carina, angulate and subcarinate at the sides, supraclypeal area narrowed above margined, clypeus higher than broad at apex, first and second cubital cells receiving the recurrent nervures near their apices.

♂ Apical narrow portion of stipes with black hairs, but little longer than the basal part, slightly exceeding the sagittae, eighth sternite produced into a rounded lamina as long as wide as its base, carinate medially.

Coloration black with yellow markings on the collar and in the ♂ upon the head and legs.....*Metylaeus* n. gen.

14. NOTHYLAEUS. n. gen.

This genus so far is Ethiopian in its distribution. Several species previously described as species of *Prosopis* are referable here and three species from West Africa are here described, one of them so peculiar as to warrant the erection of a subgenus for its reception. Type *Prosopis heraldica* Smith.

Nothylaeus heraldicus (Smith).

Prosopis heraldica Smith. Cat. Hym. Brit. Mus. 1:35 ♀
Cope of Good Hope 1853.

This species was taken in numbers visiting the flowers of various species of *Aloe* in the botanical garden in Capetown.

Nothylaeus rufipedioides (Strand).*Prosopis rubriplagiata rufipedioides* Strand.

Wiener Ent. Zeitsch. 30:135 ♂ Cape Aug. 1911.

Prosopis Junodi Fries

Archiv. Naturges. 77:131. Transvaal. 1911.

A few specimens of this species were taken with the previous species.

Nothylaeus Braunsi (Alfken).*Prosopis Braunsi* Alken

Zeitschr. fr. Syst. Hym. Dipt. 5:147, Cape Colony 1905.

My thanks are due to Dr. L. Peringuey of the South African Museum for a male of this species, taken by Dr. Brauns at Willowmore.

The following species which I have not seen are, from the descriptions, apparently referable here:

Nothylaeus rubrifacialis (Strand).*Prosopis rubrifacialis* Strand

Societas Entomologica 27:20 ♀ Togoland. Feb. 1912.

Nothylaeus sansibaricus (Strand.)*Prosopis sansibarica* Strand.

loc. cit. 30 ♀ Zanzibar. Mch. 1912.

Nothylaeus nyassanus (Strand).*Prosopis nyassana* Strand.

loc. cit. 33 ♀ L. Nyassa. Mch. 1912.

Nothylaeus binotatus (Alfken).*Prosopis binotata* Alfken. Deutsch. Ent. Zeitsch. 1914:184

♀ ♂ South Africa April 1914.

Nothylaeus Magretti (Vachal).*Prosopis Magretti* Vachal. Bull. Soc. Ent. France 1892:

cxxxv ♀. E. Sudan.

Nothylaeus gigas (Friese).

Prosopis gigas Friese. Archiv. f. Naturges. 77:132. ♀
Eritraea 1911.

To these may be added:

Nothylaeus Peringueyi n. sp.

♀ Black, mandibles, labrum, clypeus, suffusion on lower part of supra-clypeal area, scape, flagellum beneath and anterior tibiae, knees and femora within ferruginous; lateral face marks acuminate and extending above the middle of the eyes and a dot on the tegulae yellow, legs piceous brown.

Collar, margin of tubercles and interrupted bands on the posterior margins of tergites 1 and 2 with white pubescence.

Clypeus, with the surface uneven, with rather fine shallow punctures distant from each other above twice their diameter, vertex more coarsely and closely and confluent punctate; mesonotum similar, the punctures more discrete, particularly discally; scutellum similar to the disc of the mesonotum, the surface shining; mesopleura more finely and closely punctured; sides of propodeum very finely longitudinally rugulose; above, the basal area is radiately rugulose and there is an inner semicircular enclosure bounded by a fine carina; posterior face of propodeum hexagonal, angulate laterally, radiately rugulose or striolate with the petiole as a center, surface like that of the sides of the propodeum, somewhat obscured by a microscopic appressed cinereous pubescence.

Abdominal tergites microscopically transversely lineolate, impunctate, 1, 2, and 3 somewhat contracted apically; sternites 2 and 3 with fine scattered punctures.

Wings hyaline, the nervures blackish, first recurrent received near apex of first cubital cell, the second interstitial.

Length 5 mm. Length of wing 4.5 mm.

Described from a single ♀ collected at Oloke Meji, Ibadan, Nigeria, during August or September 1914 (J. C. Bridwell).

Type in the author's collection.

The species is named in appreciation of the opportunity of working for a time at the South African Museum and the kindly assistance afforded me by the director, Dr. L. Peringuey, whose comprehensive studies of South African entomology have made known many and interesting Coleoptera and Hymenoptera of South Africa and thrown much light on the biogeography of Africa, and whose administration has rendered the South African Museum one of the best of provincial museums,

making it an important factor in the development of the sciences of its region.

Nothylaeus yoruba n. sp.

♀ Black, opaque; mandibles, labrum, clypeus except middle line, antennae (flagellum darker above), pronotum (collar suffused with yellowish), legs including coxae, posterior interrupted band on scutellum, and basolateral suffusion on first tergite reddish; narrow longitudinal stripe on clypeus, acuminate mark on sides of face reaching $2/3$ of the distance to the summit of the eyes, transverse mark on the supraclypeal area and basal spot on tegulae yellow; wings hyaline, venation blackish.

Rather generally covered with sparse, fine cinerous pubescence, noticeable on the antennal foveae, cheeks, collar, tubercles, mesopleura, sides of propodeum and second and following tergites; tergites 1 and 2 with apical interrupted hair bands.

Clypeus with the surface uneven with very shallow indefinite punctures separated from each other about their own diameter, sides of face and supraclypeal area much the same, a little more definitely punctured; vertex closely and confluent punctured. Mesonotum very closely, rather finely and confluent punctured, appearing granular or shagreened with a low-power lens. Scutellum with the surface somewhat shining, with a little coarser scattered punctures; metnotum knobbed, opaque, with irregularly disposed punctures. Propodeum with a few coarse reticulations at the base of the basal area not extending to the sides or summit but a few rugae there. Mesopleura like the mesonotum, sides of the propodeum with the finer sculpture concealed by the pubescence; posterior face of the propodeum hexagonal, radiately irregularly striolate, angulate.

Abdomen subopaque, tergites microscopically transversely lineolate; the apices of tergites 1-3 but very little contracted.

Described from a single ♀ collected at Oloke Meji, Ibadan, Nigeria, during August or September 1914 (J. C. Bridwell).

Type in the author's collection.

Yoruba, the nation of agricultural negroes occupying a great part of southern Nigeria.

14a. *ANYLAEUS* N. SUBGEN. OF *NOTHYLAEUS*.

The bee described below, while agreeing with *Nothylaeus* in the characters drawn from the genital armature and the form of the concealed sternites and in the cephalic characters—labrum, mandibles and supraclypeal area, approaches *Metylaeus* in the peculiarities of the metanotum and scutellum. For the

present it may be referred to *Nothylaeus* but if the female is found to possess the same thoracic structure it may well be considered a genus. Type *Nothylaeus* (*Anylaeus*) *aberrans* Bridwell.

***Nothylaeus* (*Anylaeus*) *aberrans* n. sp.**

♂ Black; basal spot on mandibles, spot on basal elevation of labrum, clypeus except upper margin, sides of face evenly narrowed to the eye a little above the antennal sockets, spot on supraclypeal area against the clypeus, obscure stripe on outer side of scape, spot on tubercles, spot on the dorsal one of the two free sclerites of wing base behind tegulae, posterior dot on either side the depression of the scutellum, small spot on base of front and middle tibiae, basal third of hind tibiae, and basitarsi outwardly whitish; rest of tarsi and anterior tibiae and calcaria pale, mandibles except base and flagellum beneath brownish, tegulae piceous, wings hyaline, a little smoky, venation brownish.

Cheeks and occiput with short, loose, scattered plumose hairs; collar posteriorly with a feeble band of plumosity; mesosternum with the surface concealed with erect short plumose pubescence, sides and posterior face of propodeum with fine appressed scattered pubescence but little concealing the sculpture; tergite one with interrupted whitish hair band, on posterior margin (abraded), the remaining tergites with very fine scattered whitish hairs, sternites similar, the last two visible sternites also with a few erect black hairs.

Surface of clypeus uneven, coarsely punctate with ill-defined punctures removed from each other a little more than their own diameter, face and lower part of supraclypeal area with a few similar punctures. Upper part of supraclypeal area, front and vertex very coarsely and confluent punctured, the surface somewhat shining. Supraclypeal area margined with curved carinae above, contracted below, the middle elevated from the contraction, the upper portion nearly in the same plane as the front, with a median low ridge extending to the anterior ocellus.

Collar margined anteriorly, subinterrupted medially, the lateral angles prominent but blunt. Mesonotum with exceedingly coarse unevenly distributed punctures of different magnitudes, the surface between somewhat shining and irregularly transversely striolate, the parapsidal and median furrows well defined, mesopleura evenly and coarsely punctured, the punctures separated by about their own diameter. Scutellum deformed, basally with a few punctures and longitudinally lineolate, posteriorly with a profound, rounded, shining excavation a little anterior to two similar postero-lateral excavations and separated from them by two acute edged carinae extending obliquely to the main plane of the scutellum, the posterior excavations are laterally (and partly dorsally) margined with a translucent almost membranous recurved chitinous process. Metanotum profoundly excavated and shining, bounded

laterally by strong recurved costate margins which are produced posteriorly nearly one-half the median length of the metanotum. Propodeum with the basal area coarsely areolate, the basolateral areas excavated and separated from the posterior face by strong carinae; sides shagreened; posterior face more coarsely so, hexagonal, bounded laterally by carinae, profoundly channeled in the middle. Abdomen impunctate above, transversely lineolate, a little shining, tergite 1 strongly contracted apically and 2 basally and apically; sternites similar to the tergites but with some fine scattered punctures. Head broader than thorax, broader than long, eyes strongly converging below, clypeus about as high as broad at apex. Thorax and abdomen rather slender. The first recurrent is received at the apex of the first cubital cell, while the second is interstitial.

The aedeagus very similar to that of *N. heraldicus*, *N. Braunsi*, and *N. rufipedioides*, agreeing with the latter on the gentle curve of the outer side of the stipes and in the greater expansion of the sagittae in the middle as contrasted with *heraldicus* and *Braunsi*.

The eighth sternite has the margins straight on either side the apical process, *rufipedioides* has them nearly so, while they are strongly sinuate in *heraldicus* and *Braunsi*.

Length 5.5 mm., wing 4.5 mm.

Described from one ♂ collected at Oloke Meji, Ibadan, Nigeria, Aug.-Sept. 1914 (J. C. Bridwell).

Type in the author's collection.

Nothylaeus (Anylaeus) dentiferellus (Strand).

Prosopis dentiferella Strand.

Soc. Ent. 27:30 ♂ Delagoa Bay. 1912.

By the description this species is similar to *aberrans* but the structure of the scutellum is different and the metanotum (postscutellum) is not described. Strand suggests the possibility of this being the ♂ of *Magrettii* (Vachal).

15. METYLAEUS n. gen..

Type the following species.

Metylaeus cribratus n. sp.

♀ Black, mandibles rufous at apex, flagellum brownish beneath, abbreviated interrupted line on collar, tubercles, and a small spot on the knees of the front legs yellowish, wings hyaline, the nervures and stigma blackish.

Sides and posterior face of propodeum with the surface somewhat obscured by minute appressed scattered cinerous pubescence; first tergite with an apical interrupted band of white dense pubescence.

Surface opaque, microscopically lineolate between the coarse cribrate punctures of the head, thorax and first tergite. Punctures of the clypeus large shallow umbilicate, separated from each other a little less than their diameter, those of the face deeper and closer, the eyes are surrounded by a punctate furrow with finer punctures in front, distinctly margined, the margin continued to the level of the anterior ocellus. Eyes converging nearly one-half below, malar space nearly linear, clypeus a little higher than broad, supraclypeal area elevated, triangular, acuminate into a carina disappearing before it reaches the anterior ocellus.

Collar anteriorly carinate, subinterrupted in the middle; mesonotum coarsely, strongly and confluent punctured, parapsidal and median furrows indicated only as straight narrow lines. Tegulae with a few fine shallow punctures. Scutellum a little over $2/5$ as long as wide, more sparsely punctured than the mesonotum, its posterior margin impressed on either side the middle and the lateral angle produced into a tooth. Metanotum elevated, impressed in front and behind so that an elevated rina alone connects the two sides, the posterior angles on either side end in a blunt tooth. Superior face of propodeum separated from the sides and posterior face by carinae, the posterior carina costate; the area bounded by a weak carina, the surface bears a few weak coarse wrinkles two of which more or less bound a small triangular inner area and continue after uniting to the posterior carina. Mesopleura more sparsely punctured than the mesonotum. Sides and posterior face of propodeum impunctate, finer sculpture not visible for the fine pubescence.

First tergite strongly punctate, the punctures more separated than on the mesonotum; the remaining tergites only very finely and indistinctly minutely punctured, none of the tergites very much contracted at apex. The first recurrent is received by the first cubital cell near its apex; the second is interstitial or received a little before the second transverse cubitus.

♂ Resembles the female, but the sculpture particularly of the propodeum is somewhat coarser. The teeth of the scutellum and metanotum are more produced, those of the metanotum becoming long spines more than half as long as the distance between them. The second tergite is rather strongly but much more finely punctured than the first and both are strongly contracted at apex.

The markings of the collar are reduced, a triangular yellow spot with the apex down lies beneath the antennae and against the margin of the supraclypeal area and the clypeus but does not touch the orbit, anterior tibiae and tarsi outwardly with a pale stripe.

The discussion of the genitalia given under the genus applies to this species.

Length 4.5--5 mm., wing 5 mm. Some males smaller.

Described from 24 ♀ 14 ♂ collected in August and September 1914 at Oloke Meji, Ibadan, Nigeria (J. C. Bridwell).

Type ♂, allotype and paratypes in the author's collection. paratypes in the collection of the Hawaiian Board of Agriculture and Forestry.

From the descriptions two previously described species belong to this genus:

***Metylaeus catalaucoides* new name.**

Prosopis Boulyssoui Vachal.

Ann. Soc. Ent. France 68:565 ♂ (*nec* ♀) N'Doro
1899.

***Metylaeus scutispina* (Alfken).**

Prosopis scutispina Alfken

Deutsch. Ent. Zeitsch. 1914:195 ♂. Rhodesia.

The former species appears to differ from *cribratus* by the shorter (triangular) metanotal spine and the presence of a yellow spot on the supraclypeal area, *M. scutispina* differs by the red mandibles, labrum, and anterior edge of the clypeus, the rest of the clypeus being yellow. The sculpture of the second tergite in the description is not indicated as different from that of the first.

16. GNATHYLAEUS n. gen.

The single species described under this genus resembles very closely the male later described as *Hylaeus* (*Nesylaeus*) *nesoprosopoides* and the material from which they were described was taken together. The mandibles of the two are, however, wholly unlike and I have never seen a sexual dimorphism in the family Hylaeidae which would parallel this. The first tergite is different in the two species but not more so than in some *Hylaeus*. I do not, however, believe they belong to the same species.

It will be interesting to examine more material and the generic characters can no doubt be amplified when the male

genitalia can be examined. The genus is nearer *Hylaeus* than to *Gnathoprosopis* but seems sufficiently distinct from either.

The propodeum, supraclypeal area and other characters are apparently as in *Hylaeus*. Type the following species.

***Gnathylaeus Williamsi* n. sp.**

♀ Black; heavy inverted T-shaped mark on clypeus, sides of face to antennae and from there narrowed to the orbits, collar interrupted medially, tubercles, basal internal spot on tegulae, external basal stripe on anterior and middle tibiae and basal half of hind tibiae sulfur yellow; calcaria whitish, apex of mandibles, flagellum beneath and tarsi brownish; wings hyaline, venation of front wings blackish, of hind wings pale.

Surface of propodeum except the basal area somewhat concealed by fine scattered cinereous appressed pubescence, hind margins of first tergite with a widely interrupted white hair band, second and third tergites with similar hair bands, evident only in certain lights.

Clypeus longitudinally microscopically lineolate and with rather coarse well-separated punctures. Front and vertex closely and confluent punctured. Mesonotum much the same, punctures of scutellum well separated, metanotum shagreened, area of propodeum rugose-shagreened, mesopleura much as the mesonotum.

Abdomen with tergite 1 highly polished and shining with a few shallow minute scattered punctures, second and following tergites less shining with minute shallow punctures distant from each other two or three times their diameters; tergites 1-3 but very little contracted; sternites a little more coarsely punctured.

Length about 6 mm.; wing 4.5 mm.

Described from two ♀ collected at Los Banos, Luzon, Philippine Islands (F. X. Williams).

Type and paratype in the author's collection.

17. *Nesoprosopis* Perkins.

Dr. Perkins has described a species from China as *Nesoprosopis chinensis*. I have a male which is strictly congeneric with this from the Philippine Islands and I am convinced that these species should be separated from *Nesoprosopis*. This and the new species are referred to a subgenus of *Hylaeus* which I call *Nesylaeus*, since I can find no character to separate these species from *Hylaeus* except the male genitalia.

Nesoprosopis was separated by Dr. Perkins largely on the character of the eighth sternite of the ♂ and this does not seem to me to be so strongly different from some species still remaining in the old genus *Prosopis*.

He supplements this character by the lack of enclosure of the basal area of the propodeum. Most of the species have absolutely no clear line bounding this area. However the area is clearly defined in some of the species such as *N. fuscipennis* (Smith) and *N. pubescens* Perkins.

I am inclined in studying the Hylaeidae to give considerable importance to the structure of the supraclypeal area and its extension above between the antennae. While frequently it is not easy to describe this structure, it seems to be very characteristic in the different groups. In this character *Nesoprosopis* differs from *Hylaeus* in the more limited sense which I should use it. In *Nesoprosopis* this area is convex between the antennae and narrowed, rounding down at the sides to the rest of the surface without angles, ridges or carinae; it is also not narrowed in the middle nor expanded and elevated at its summit, but is sub-triangular in form, and with a fine shallow channel leading from near its summit near to the anterior ocellus.

The sides of the propodeum are separated from the posterior face by a sharp angle not rounded off nor on the other hand surrounded by carinae as in many species described as *Prosopis*. This structure is identical with that of typical *Hylaeus*.

18. *HYLAEUS* Fabricius (Latreille emend).

The species of Europe and North America described mainly as *Prosopis* may perhaps some of them be broken off into separate subgenera but generally speaking, those which I have seen seem congeneric. I have not been able to examine many of the European species, but those which I have do not seem readily separable. Generally speaking the species show little differentiation in the character of the aedeagus. More variation

exists in the structure of the seventh and eighth sternites but these differences do not seem significant enough to form generic divisions upon. There are, however, differences in the form of the supraclypeal area, of the collar and of the propodeum which may on further study be found to supplement the genital characters. Thus the Boreal American *Hylaeus basalis* (Smith) may well be isolated since there are differences there in bodily structure in addition to the genital characters. On the other hand *Hylaeus pictus* (Smith) of which I have seen specimens from Malaga, while differing greatly in coloration and appearance from other European and the North American species, does not appear to have either genital or somatic characters warranting its removal from the genus *Hylaeus*. While time and the material at my disposal has limited my examination to about thirty Australian species I have not seen any species which seems assuredly referable to *Hylaeus*, tho some seem close to that genus. An interesting color group there is that of the black species with the scutellum and metanotum yellow, which by the examination of the genitalia and somatic structures would fall into about four distinct genera, with ample characters for their separation. From Africa I have seen several species in the group of *Hylaeus curvicastratus* (Cameron) which are clearly *Hylaeus* but they have excellent group characters which I have considered warrant the erection for them of the subgenus *Deranchylaeus*. Some Japanese species are here described which some of them seem typical, while two of these species are more divergent. I have unfortunately not seen any of the neotropical species.

19. DERANCHYLAEUS n. subgen. of HYLAEUS.

In my travels in Africa in 1914 and 1915 besides the species here separated in the genera *Metylaeus* and *Nothylaeus* I found nine species of *Hylaeus* falling into a compact group differing from all other species of *Hylaeus* which I have seen by the supraclypeal area being bounded laterally by two fine outwardly curved carinae and not at all declivous above. The

collar is also broader than usual and is often acute or carinated in front, never subinterrupted. The males have the sides of the seventh sternite with long teeth or spines much as in the *Cressoni* group of North America but the eighth sternite is never bilobate or expanded at apex. The aedeagus is ordinary in form for *Hylaeus*. This group is Ethiopian so far as my knowledge goes. Type *Prosopis curvicarinata* Cameron.

The following table will serve to distinguish the species of *Deranchylaeus* collected in Africa during 1914 and 1915 and the notes and bibliography may assist in the study of the group. With the species treated under *Metylaeus* and *Nothylaeus*, it is designed to include in the present treatment all Ethiopian Hylaeidae so far known.

Females.

1. First tergite distinctly punctate, the punctures nearly as large as those of the mesonotum 2
- First tergite impunctate or with very minute punctures 5
2. Clypeus not impressed *immarginatus*
- Clypeus impressed subapically 3
3. Impression of clypeus not definitely limited above.
- Mark on the face opposite the base of the antennae narrowed below, subinterrupted line on the collar, spot on the base of the tegulae and on the tubercles whitish *Drègei*
- Impression of clypeus transverse well defined, collar and tubercles dark, knees more or less pale 4
4. Clypeus medially subtuberculate above the impression, basal one fifth of hind tibiae pale outwardly *Haygoodi*
- Clypeus not subtuberculate above the impression; hind knees and tibiae entirely dark *Lightfooti*
5. Propodeum with the basolateral areas separated from the posterior face by a carina 6
- Propodeum with the basolateral areas not separated from the posterior face 7
6. Mandibles, clypeus, supraclypeal area below, lower

angles of sides of face and flagellum ferruginous

..... *xanthostoma*
 Flagellum darker, face entirely dark..... *longulus*

7. Inner orbits with a very small whitish spot a little
 above the antennal sockets..... *curvicarinatus*
 Inner orbits with a white line reaching much above
 the antennal sockets *bequaertianus*

Males

1. Apical lobe of 7th sternite hornlike, 1st tergite not
 strongly punctured 2
 Apical lobe of 7th sternite flaplike..... 3
2. 1st tergite microscopically distinctly and evenly
 sparsely punctured, yellow mark on sides of face
 contiguous with the eyemargins above... *curvicarinatus*
 1st tergite not distinctly punctured, white marks of
 sides of face curving over base of antennae.....
 *bequaertianus*
3. Seventh sternite with the lateral teeth strongly devel-
 oped, first tergite distinctly and strongly punctate.... 4
 Seventh sternite with the teeth feebly developed, first
 tergite not distinctly punctate..... *longulus*
4. Basal area of propodeum not differentiated from the
 basolateral areas, stipites rounded at apex, not
 obliquely truncate outwardly 5
 Basal area of propodeum strongly differentiated from
 the basolateral areas, the latter strongly and distinct-
 ly punctate, stipites acute at apex obliquely truncate
 outwardly *immarginatus*
5. Basal area longitudinally rugose, apical process of 8th
 sternite acute nearly as long as the width, on either
 side, of the basal part, clypeus shallowly impressed
 over most of its surface..... *Drègei*
 Basal area vermiculate and confusedly closely rugulose,
 process of 8th sternite short, blunt, less than half the
 width on either side, clypeus convex..... *Lightfooti*

Hylaeus (Deranchylaeus) albonasatus (Strand).

Prosopis albonasata Strand. Soc. Ent. 27:30 ♂ South Africa 1912.

Has a semilunar carina on the third sternite.

Hylaeus (Deranchylaeus) Alfkeni (Frieese).

Prosopis Alfkeni Frieese.

Zool. Jahrb. Abt. Syst. 35:583 ♂ Rhodesia. 1913.

♀ Pronotum, mesonotum, and apices of tergites 1-3 fringed with white pubescence, face black, 1st and 2d tergites very densely and coarsely punctured.

♂ Similar, scape black, not widened above.

Hylaeus (Deranchylaeus) Arnoldi (Frieese).

Prosopis arnoldi Frieese. Zool. Jahrb. Abt. Syst. 35:584 ♂ Rhodesia. 1913.

Prosopis xanthopus Alfken.

Deutsch. Ent. Zeitschrift. 1914:197 ♀ Rhodesia.

Alfken gives no reason for separating his species from Frieese's from the same locality. The differences appear to be merely sexual.

A coarsely sculptured species with the mandibles, labrum, clypeus, legs and antennae red. Differs from *xanthostoma* by the red legs, those of *xanthostoma* being black.

Hylaeus (Deranchylaeus) aterrimus (Frieese).

Prosopis aterrima Frieese.

Arch. Naturges. 77:129 ♀ Transvaal 1911.

Prosopis quinquedentata Frieese. l.c. 132 ♂ Transvaal.

Prosopis aterrima Alfken.

Deutsch. Ent. Zeitschr. 1914:189 ♀ ♂.

♀ Resembles *immarginatus* but the clypeus has a yellow median line and the lateral face marks are broadened within near the middle.

♂ Clypeus with a yellow median line.

Hylaeus (Deranchylaeus) atriceps (Friese).

Prosopis atriceps Friese.

Arch. Naturges. 77:130 ♀ Transvaal 1911.

Prosopis atriceps Alfken.

Deutsch. Ent. Zeitschr. 1914:187 ♀ (nec ♂).

The male described as *atriceps* ♂ by Alfken is certainly the same as one taken by me at Capetown but the female I have associated with it is not *atriceps* Friese but *tenuis* Alfken. Probably *atriceps* is a distinct species with a more northern distribution. The Capetown species I believe to be *curvicarinatus* (Cameron).

Hylaeus (Denrachylaeus) bequaertianus n. sp.

♀ This species is very like *curvicarinatus* but differs by the characters given in the table, a whitish line extending along the inner orbits to the lower end of the supraorbital foveae. The microscopic punctures of the first tergite are exceedingly shallow and hardly to be distinguished even with a binocular.

♂ The male has the pale coloration whitish rather than yellow and the face marks are curved away from the eye margin over the antennal sockets and in none of the individuals studied is there a trace of a light mark on the supraclypeal area. The apices of all the tibiae are pale while the pale band on the base of the hind tibia is reduced, otherwise practically like *curvicarinatus*.

The genitalia of this species and of *curvicarinatus* are practically alike and the description of this species will serve for both, the differences being pointed out.

Edeagus with the stipites rounded at apex extending to the tips of the sagittae, with a few stout straight acuminate hairs at apex, basal part about as long as the narrow apical part.

Eighth sternite with the apical process truncate at apex; about as long as the width, on either side, of the basal part, the basal part is produced somewhat into a rounded lobe on either side. In *curvicarinatus* the process is a little shorter and rounded at apex.

Seventh sternite with a basal and apical lobe on either side, the apical lobe is chitinous and hornlike but a little compressed, the basal lobe is a little shorter but little chitinized and a little strap-shaped bearing a few long spines or teeth on its anterior margin. In *curvicarinatus* the apical lobe is shorter, less compressed and more hornlike, while the basal lobe is shorter and more rounded and the teeth much feebler, the sinus between the two lobes being conspicuous in *bequaertianus* and hardly perceptible in *curvicarinatus*.

Five ♀♀ and seven ♂♂ collected at Oloke Meji, Ibadan, Nigeria, Aug.-Sept. 1914 (Bridwell).

Type ♂, allotype and paratypes in the author's collection.

Named in honor of Dr. Joseph Bequaert of the American Museum of Natural History, whose recent work on the Ethiopian Vespidae is an example of what systematic work at its best may be.

Hylaeus (Deranchylaeus) Bouyssoui (Vachal).

Prosopis bouyssoui Vachal. Ann. Soc. Ent. France
68:535 ♀ (*nec* ♂). N'Doro 1899.

Hylaeus (Deranchylaeus) capicola (Alfken).

Prosopis capicola Alfken.

Deutsch. Ent. Zeitschr. 1914 ♀ Algoa Bay, So. Afr.

Differs from *longulus* by the finer puncturing of the head, the shorter supraorbital fovea, the short yellow line on the clypeus, the yellow line on the pronotum, spot on tubercles and finer puncturing of the thorax.

Hylaeus (Deranchylaeus) curvicastratus (Cameron).

Prosopis curvicastrata Cameron. Trans. So. Afr. Phil.
Soc. 15:236 ♂ Pearston, Cape Colony 1905.

?*Prosopis robertiana* Cameron.

Trans. So. Afr. Phil. Soc. 16:325 ♂ Pearston, Cape Colony 1906.

Prosopis atriceps Alfken (*nec* Friese).

Deutsch. Ent. Zeitschr. 1914:188 ♂ (*nec* ♀) Port Elizabeth, Cape Colony, So. Afr.

Prosopis tenuis Alfken.

l.c. 188 ♀ (♂?) Algoa Bay, So. Afr.

I have 16 ♀♀ and 22 ♂♂ which were determined at the South African Museum as *atriceps*. The sexes were associated by breeding them from nests in twigs like those of the European and North American species. After a careful study of the description I find that the female corresponds more closely

with the description of *tenuis* though there are definite strong hair patches on the lateral margins of tergites 1-3 and the length is 5 mm. or a little more. The male agrees well with the ♂ described as the ♂ of *atriceps*. Some of the males have the supraclypeal area dark except a narrow line along the anterior margin. These are similar to the male described as *tenuis* ♂ and belong with the others as proved by the study of the genitalia. After carefully reading Cameron's descriptions of *Prosopis curvicastrata* and *robertiana* I am inclined to believe that both of them refer to the same species and that the material compared as *curvicastrata* with *robertiana* was some other species. The species is apparently the same as *tenuis* Alfken, but only the examination of the types could remove all uncertainty—if it could be ascertained which is Cameron's true type.

The differences of venation mentioned by Cameron are of no importance since I have found the same difference in the venation of males of this species ascertained to be the same by the examination of the genitalia.

Hylaesus (Deranchylaeus) Dregei (Strand).

Prosopis dregei Strand.

Soc. Ent. 27:27 ♂ Cape Colony, So. Afr. 1912.

The ♀ previously undescribed is perhaps sufficiently differentiated in the table. The 1st and 2nd tergites bear apical lateral white hair patches. Length 6 mm.; wing 4.5 mm.

♂ Seventh sternite with the lateral spines very strongly developed on the sides of the middle piece and the posterior (apical) margin of the basal lobes, the apical lobes flaplike, elongate, membranous.

Median process of 8th sternite elongate (somewhat similar that of *Hylaesus nipponicus* but not so acute nor so strongly chitinized), about as long as the width of the basal part on either side. The sides of the basal part in a straight line with each other.

Edeagus with the stipites about as long as the sagittae.

One ♀ and 2 ♂ ♂ collected at Cape Town, Jan.-Apr. 1915 (Bridwell).

Hylaeus (Deranchylaeus) flaviscutum (Alfken).

Prosopis flaviscutum Alfken.

Deutsch. Ent. Zeitschr. 1914:193 ♀ ♂ Cape 1914.

♀ Differs from *immarginatus* in having tergites 1-3 with fine white apical hair bands.

♂ The male has the scape not expanded above.

Hylaeus (Deranchylaeus) gabonicus (Vachal).

Prosopis gabonica Vachal.

Ann. Soc. Ent. France 68:536 ♀ W. Afr. 1899;

Op. Cit. 72:400 ♂ W. Afr. 1903.

The description of the female is not entirely adequate; the basolateral areas of the propodeum are said to be discrete from the declivity "vix modico jugo" and the wings infusate, otherwise the species would seem to resemble *bequaertianus* rather closely.

The male is described as having the apex only of the clypeus yellow.

Hylaeus (Deranchylaeus) Gaullei (Vachal).

Prosopis Gaullei Vachal.

Ann. Soc. Ent. France 68:536 ♀ W. Afr. 1899.

Differs from *Dregei* by having two long sulculi on the clypeus and the metanotum with two minute tubercles.

Hylaeus (Deranchylaeus) Haygoodi n. sp.

Dregei, *Haygoodi*, and *Lightfooti* form a closely related group to which probably *Gaullei* also belongs in which the anterior portion of the clypeus is impressed, the first tergite is strongly punctate and the second more finely so, the first tergite has white apical lateral hair patches and the second more feeble ones. The basal area of the propodeum is vermiculate rugose in *Dregei* and *Haygoodi* and more feebly reticulate in *Lightfooti*, in no case strongly defined, the basolateral areas which are not discrete are strongly punctured. In *Haygoodi* the punctures of the 1st and 2nd tergites are stronger and coarser, and less different on the two segments than in the other species. Otherwise I have nothing to add to the characters given in the table.

Described from 1 ♀ collected at Cape Town, Jan.-Apr. 1915 (Bridwell).

Type in the author's collection.

Named in honor of Mr. Haygood, American vice-consul at Cape Town, who in addition to his official duties adds to the enjoyment of Americans in Cape Town by his kindly offices in giving opportunities to enjoy the mountains and their life, in appreciation of courtesies received and help given.

● **Hylaeus (Deranchylaeus) immarginatus (Alfken).**

Prosopis immarginata Alfken.

Deutsch. Ent. Zeitschr. 1914:187 ♀ Algoa Bay,
So. Afr.

The ♂ hitherto undescribed has the clypeus except a narrow band along the anterior margin, a triangular spot on the sides of the face filling them to near the summit of the clypeus, from there narrowed to a narrowly extended point on the eyemargin about even with the lower edge of the antennal sockets, spot on the outer base of rfont tibiae calcaria, middle and hind basitarsi except at apex whitish, anterior side of anterior tibiae sordid yellowish, flagellum light brownish beneath.

Scape suddenly expanded at about half its length from the base on the outer side to about twice its width at base.

Seventh sternite similar to that of *Dregei* but the apical lobes shorter, the basal lobes with the apical edges not straight and the teeth stronger and crooked.

Eighth sternite with the apical process short, acute, and about one-half the length of the distance, on either side, of the basal part.

Two ♀♀ and seven ♂♂ collected at Cape Town Jan.-Apr. 1915 Bridwell.

Hylaeus (Deranchylaeus) krebsianus (Strand).

Prosopis krebsiana Strand.

Soc. Ent. 27:33 ♀ Cape Colony 1912.

Resembles *immarginatus* Alfken but differs by the structure of the clypeus. From the species with the clypeus impressed, *Dregei*, *Lightfooti*, and *Haygoodi*, it differs by the long whitish line along the orbits.

Hylaeus (Deranchylaeus) leucolippa (Frieese).

Prosopis leucolippa Frieese.

Deutsch. Ent. Zeitschr. 1913:574 ♂.

Zool. Jahrb. Abt. Syst. 35:582 ♂ German South West Africa 1913.

This species agrees with *longulus* in having the labrum and mandibles yellow in the male but the first tergite is strongly punctured. Possibly this is the male of *Bouyssonii*, the male described as such being a *Metylaeus*.

Hylaeus (Deranchylaeus) Lightfooti n. sp.

♀ The characters of the female and its differences from the related species are brought out in the table and in the discussion of *H. Haygoodi*.

Length 6 mm.; wing 4.5 mm.

♂ Resembles the ♂ of *immarginatus* but has the 1st and 2nd tergites much more finely punctured. The lateral face marks extend above the antennal sockets, being narrowed from the supraclypeal area or just beneath the antennal sockets, the supraclypeal area has a white transverse mark at its apex, large spot on tegulae, anterior tibiae outwardly, all the tarsi except the somewhat darkened tips, middle tibiae slightly outwardly at base and apex and basal half (nearly) of hind tibiae whitish yellow; flagellum beneath pale brown, anterior tibiae pale brownish in front.

Scape strongly punctured evenly broadened from the base, nearly twice as broad at apex as the pedicel.

Length 5.5 mm.; wing 4.5 mm.

One ♀ and one ♂ collected at Cape Town Jan.-Apr. 1915 (Bridwell). Type and paratype in the author's collection.

Named for Mr. Lightfoot, assistant in the South African Museum, who has collected many interesting South African insects.

Hylaeus (Deranchylaeus) lineaticeps (Frieese).

Prosopis lineaticeps Frieese.

Deutsch. Ent. Zeitschr. 1913:573 ♀ Cape Colony.

Zool. Jahrb. Abt. Syst. 35:582 ♀. 1913.

Prosopis lineaticeps Alfken.

Deutsch. Ent. Zeitsch. 1914:190 ♀ ♂ Cape Colony, Natal.

Similar to *Drègei* but there are two narrow furrows leading

from the impression of the clypeus, and the eyes do not converge below.

♂ Has only the first tergite with lateral hair patches and the 3d and 4th sternites have more or less distinct tubercles.

Hylaeus (Deranchylaeus) longulus (Friese).

Prosopis longula Friese.

Deutsch. Ent. Zeitschr. 1913:574 ♂ Rhodesia.

Zool. Jahrb. Abt. Syst. 35:583 ♂. 1913.

Prosopis longula Alfken.

Deutsch. Ent. Zeitschr. 1914:192 ♂ Rhodesia.

The ♀ has not been hitherto described.

♀ Black; anterior knees and tibiae in front and spot on tegulae yellow, flagellum light brown beneath, tarsi a little brownish, wings hyaline, the nervures brown.

Head a little longer than broad, the eyes converging below; clypeus, lower portion of supraclypeal space and sides of face longitudinally lineolate with very shallow rather coarse punctures separated by less than their diameter, those on the sides of the face coarser and more distinct; genae longitudinally lineolate with 4 series of large shallow umbilicate punctures, front much more strongly punctate, the punctures seriate along the orbits, interstices tessellate; vertex unevenly punctate the punctures along the occiput confluent; sulcate longitudinal carina of the middle of supraclypeal area not strong but approaching the anterior ocellus, supraorbital fovea reaching the level of the summit of the eye.

Collar with the anterior margin acutely carinate, a median hair patch on its surface, anterior angles acutely subdentate, the surface uneven very minutely tessellate but impunctate mesonotum with strong deeply impressed coarse punctures confluent anteriorly, from the anterior third posteriorly, the punctures discrete, separated by their own diameter or more interstices strongly tessellate, scutelum similar, metanotum contrasting, the punctures coarser and closer, the tessellation of the interstices stronger; mesopleura similar to the mesonotum. Basal and basolateral areas of propodeum discrete, separated from the posterior face by a strong carina. Basal area with some reticulate pits anteriorly limited by an irregular carina, the rest and the basolateral areas coarsely irregularly reticulate, the surface tessellate, shining. Sides of propodeum opaquely tessellate, finely, strongly and closely punctate, separated from the basolateral and posterior areas by carinae, the posterior face rather coarsely reticulate, the furrow rather narrow and definitely marked.

Tergites transversely lineolate tessellate, the first microscopically sparsely shallowly punctate, appearing impunctate with a hand lens.

Tergite 1 apically and 2 basally and apically a little contracted; sternites similar but distinctly irregularly finely and sparsely punctate.

Pubescence noticeable only on sides of pronotum, middle of collar, lateral apical hair patches on tergite 1, emargination of sternite 5, apical silvery patches on outer tips of the tibiae and a basal one on hind tibiae, and the tarsi.

First recurrent received by 1st cubital cell, second interstitial.

Length 5.5 mm.; wing 4 mm.

♂ Stipites acute, extending beyond the sagittae; 8th sternite with the apical process V-shaped, the sides not produced; 7th sternite with the teeth rather feeble but long, the apical lobe long and strap-shaped, much longer than the basal.

Two ♀ ♀ and two ♂ ♂ collected at Oloke Meji, Ibadan, Nigeria, Aug.-Sept. 1914 (Bridwell).

The ♀ differs from *Bouyssoui* Vachal in the mesonotum being not longitudinally impressed, the collar black, and the first tergite practically impunctate.

Hylaeus (*Deranchylaeus*) *rugipunctus* Alfken.

Prosopis rugipuncta Alfken.

Deutsch. Ent. Zeitschr. 1914:192 ♀ ♂ Cape Colony.

♀ Differs from *immarginata* in the yellow collar and coarser puncturing of the abdomen and the basal area of the propodeum is margined behind.

♂ Has the supraclypeal area black, scape not widened.

Hylaeus (*Deranchylaeus*) *xanthostoma* (Alfken).

Prosopis xanthostoma Alfken.

Deutsch. Ent. Zeitschr. 1914:196 ♀ ♂ South Africa, Belgian Congo.

One ♀ Oloke Meji, Ibadan, Nigeria, Aug.-Sept. 1914 (Bridwell).

20. NESYLAEUS n. subgen. of HYLAEUS.

The species which is described below is so similar in form and general structure to the species of *Hylaeus* that I can find no external structure distinguishing it. It has, however, the eighth sternite bearing an apical process similar to that of

Nesoprosopis anthracina Smith but somewhat more slender and a little less erect in its origin from the basal plate of the sternite. The edeagus, however, has the stipes greatly elongate and attenuate as described in the genus *Nothylaeus*. The basal area of the propodeum is undefined with a few transverse weak and indefinite rugae. Type *Hylaeus* (*Nesylaeus*) *nesoprosopoides* Bridwell.

***Hylaeus* (*Nesylaeus*) *nesoprosopoides* n. sp.**

♂ Black, spot on anterior basal margin of mandibles, spot on labrum, clypeus except anterior and fine upper lateral margins, sides of face narrowed at the antennal sockets and above them rounded off to the eye, spot on the supraclypeal area, obsolescent spot on base of scape, line on the collar narrowed inwardly and interrupted, tubercles, basal half of tegulae, anterior knees and tibiae outwardly, large spot on base of middle tibiae, basal half of hind tibiae, basitarsi and second joints of tarsi yellow; calcaria pale; tarsi brownish beyond second joint; flagellum not perceptibly paler beneath; wings hyaline, the nervures brownish.

Cheeks, occiput and mesopleura with fine scattered, pale hairs, collar feebly pubescent behind, mesonotum with fine, evenly placed, sparse yellowish hairs, sides of propodeum and its posterior face with the surface more or less concealed by fine rather close appressed plumose pubescence. First and second tergite with interrupted white hair bands on the apical margins. Second and following tergites with scattered decumbent fine, dark hairs.

Clypeus except at apex, supraclypeal area, and sides of face longitudinally lineolate and sparsely punctured, front and vertex strongly and very densely punctured with moderate subconfluent punctures, the surface somewhat shining. Mesonotum similarly punctured, the punctures a little more separated, the surface duller, microscopically tessellate; mesopleura similar; scutellum similar but the punctures coarser, unevenly spaced and removed from each other by more than their own diameter, mesonotum similar but the punctures very shallow; area of propodeum entirely indefinite, shining, with a few indefinite, irregular transverse rugae, rounded evenly down to the posterior face which has a deep longitudinal median sulcus, carinate laterally, some shallow oblique punctures are visible above the pubescence, and surface pubescent below apparently above the pubescence, and surface where it is pubescent is apparently rather densely punctured.

First tergite highly polished and shining, almost impunctate medially laterally rather closely and strongly punctured, second tergite rather evenly and strongly though finely punctured, the surface duller as are the remaining tergites, second tergite contracted apically and basally, the third apically, the sternites shining and sparsely shallowly punctured.

A compact species, the head as broad as the thorax, about as broad as long, eyes strongly convergent below, scape not strongly dilated, arched on the side next the head. Pronotum with the collar rounded, narrowed and subinterrupted medially, the angles not prominent. First recurrent received by the first cubital cell near its apex, the second interstitial or nearly so.

Length 5.5 mm.; wing 4.5 mm.

Described from one ♂ collected in 1917 at Los Banos, Philippine Islands (F. X. Williams).

Type in the author's collection.

Hylaeus (*Nesylaeus*) *chinensis* (Perkins).

Nesoprosopis chinensis Perkins.

Trans. Ent. Soc. Lond. 1911:725 ♂. China.

21. JAPANESE HYLAEUS.

Frederick Smith described two species of the genus from Japan under the names of *Prosopis floralis* and *Prosopis perforata* (Tr. Ent. Soc. Lond. 1873:199) and Vachal one *Prosopis globula* (Bull. Mus. Hist. Nat. Paris 9:132, 1893). *Hylaeus floralis* (Smith) by the description closely resembles the species described below as *Hylaeus gnathylaeoides* but differs in slight details of coloration of the legs and in the coloration of the wing veins. I should, however, consider my species the same except for the different male which I associate with these females. *H. floralis* is described from Hiogo on the southern coast while *H. gnathylaeoides* comes from the mountains of the interior. *Hylaeus perforatus* is said to differ from *floralis* in having the head longer and the clypeus with only the anterior margin pale and the truncation of the propodeum abrupt with the margins somewhat raised. I have not been able to consult the description of *Hylaeus globulus* (Vachal) and do not know if it is identical with one of the following species. *Prosopis Miyakei* Matsumura from the island of Sakhalien, from the description, (Jour. Coll. Agr. Sapporo 4:108, 1911) is not a *Hylaeus* but probably belongs to the Halictidae, perhaps to *Evylaeus* Robertson.

Mr. Frederick Muir has collected the species which are now described. These may be tabulated as follows:

FEMALES.

1. With some yellow coloration, head not elongate, area of propodeum rather coarsely rugose only in one species smooth apically ----- 2
 Entirely without yellow coloration, head somewhat elongate ----- *Hylaeus niger*
2. Sides of face more or less yellow, posterior face of propodeum not surrounded by strong carinae ----- 3
 Head entirely black, propodeum with the posterior face surrounded by strong carinae except where the basal area rounded by strong carinae except where the basal area extends over upon the declivity ----- *Hylaeus nipponicus*
3. Clypeus without yellow markings, supraclypeal area not contracted in the middle and expanded and furrowed above 4
 Clypeus with a median longitudinal mark, supraclypeal area slightly contracted in the middle, a little expanded and strongly elevated and channeled above -----
 ----- *Hylaeus gnathylaeoides*
4. Edge of collar rounded, the pubescence on its posterior face rather feeble ----- 5
 Edge of collar subcarinate, acute, the pubescence on its posterior face relatively strong and plumose -----
 ----- *Hylaeus Matsumurai*
5. Smaller species (5 mm.); lateral face marks in a line along the orbits; tegulae with a yellow spot; collar more narrowed medially; punctures of mesonotum shallower -----
 ----- *Hylaeus paulus*
 Larger species (7 mm.); lateral face marks triangular, tegulae black; punctures of mesonotum closer and deeper ----- *Hylaeus monticola*

MALES.

1. Third sternite simple ----- 2
 Third sternite with a spine on either side the disc connected by a ridge ----- *Hylaeus gnathylaeoides*
2. Scape not greatly widened ----- 3
 Scape broader than long, about five times as wide as the pedicel ----- *Hylaeus nipponicus*
3. Supraclypeal area entirely, stripe on scape, small spot on tubercles, etc., yellow, apical lobe of seventh sternite more feebly developed ----- *Hylaeus monticola*
 Supraclypeal area except margins, scape and tubercles dark, apical lobe of seventh sternite more strongly developed ----- *Hylaeus* sp.

Hylaeus niger n. sp.

♀ Entirely without yellow coloration, black, calcaria pale, tarsi brownish. Head elongate. Clypeus and sides of face longitudinally lineolate with sparse shallow punctures, vertex more densely, deeply and finely punctured; mesonotum more finely punctate; mesopleura a little shining more sparsely punctate, scutellum a little shining, sparsely punctured; metanotum with the area rough chartaceous basally, smooth and shining apically, sides and posterior face very shallowly punctate.

Tergites rather highly polished but not very highly shining, the minute pilosity somewhat obscuring the reflections. Tergites not contracted, only a very faint trace of apical hair bands. Sternites transversely lineolate with irregular minute punctures from which the hairs arise.

Wings subhyaline, venation brownish, recurrent nervures interstitial.

Form slender, abdomen elongate, eyes slightly converging below, collar rounded above, not narrowed or sub-interrupted in the middle, supra-clypeal area contracted in the middle, expanded and elevated above and bearing a sulcus which continues a short distance on the front.

Length 7 mm.; wing 5 mm.

Described from two ♀ collected at Chiuzenji (4000-5000 ft.) July-August 1913.

Type and paratype in the author's collection.

Hylaeus nipponicus n. sp.

♀ Head entirely black. Propodeum with the basal area well defined coarsely irregularly reticulately, the posterior face bounded by carinae except where the apex of the area extends over upon it, basolateral areas well defined by carinae.

Black; spot on tubercles, one on the tegulae, front and middle knees and basal half of hind tibiae yellow, calcaria pale, flagellum brownish red beneath, wings brownish hyaline, the nervures brownish.

Clypeus with the surface opaque irregularly longitudinally lineolate with faint, shallow scattered punctures, supra-clypeal area similarly but more regularly lineolate, sides of face similar but the lineolations increased to striations against the eyes; vertex and front somewhat shining strongly and discretely punctate; occiput transversely lineolate or striate; mesonotum similar to the front, the parapsidal and median lines well indicated but not impressed; scutellum similar; mesopleura similarly but more coarsely punctured, somewhat striate above; sides and posterior face of propodeum chartaceous or finely rugulose.

First tergite highly polished and shining with a few widely scattered, minute punctures, the remaining tergites less highly polished and the reflections broken by the minute pubescence; tergites 1-3 but very little contracted; sternites transversely lineolate, more definitely punctured.

A short, compact species, the head short, eyes not very strongly convergent below, supraclypeal area, a little contracted medially, expanded and elevated above, bearing a fine furrow which extends over the front to the anterior ocellus. Collar acute in front, narrowed or subinterrupted in the middle. The recurrent nervures interstitial or nearly so.

♂ Scape broader than long, about five times as wide as the pedicel, strongly concave on the side next the head.

Black; clypeus, spot rounded above on supraclypeal area, sides of face to above the antennae rounded a little away from the orbit above, longitudinal stripe on outer side of scape, spot on tegulae and tubercles, knees, tibiae and tarsi, except large subapical inner infuscate spots on anterior and middle tibiae and a dark subapical mark surrounding hind tibiae subapically, yellow.

Eighth sternite with the basal process strong, dorsoventrally expanded, the apical process elongated, strongly chitinized as seen from the side with a carina ending in a tooth about half way to the end, the end is acuminate and regularly curved ventrally from the plane of the sternite. Stipes regularly rounded at apex with a few plumose brown hairs, exceeding a little the sagittae and the inner margin curved for their reception, the narrowed portion longer than the broader basal portion.

♀ Length 6.5 mm.; wing 5 mm.; ♂ 5.5 mm.; wing 4.5 mm.

Described from nine ♀ and one ♂ collected at Karuizawa, September 1913.

Type ♀, allotype and paratypes in the author's collection, paratypes in the collection of the Hawaiian Sugar Planters' Association.

***Hylaeus gnathylaeoides* n. sp.**

♀ Clypeus with a broad longitudinal mark not attaining the margin (and 2 subapical lateral spots in the paratype) and (paratype) a spot on the supraclypeal area yellow. Supraclypeal area slightly contracted in the middle, a little expanded and strongly elevated and channeled above, the channel extending feebly to the anterior ocellus.

Black, longitudinal mark on clypeus, sides of face to the level of the summit of the clypeus and triangularly extended along the orbit a little above the superior margin of the antennal sockets, sometimes a supraclypeal spot, band on collar narrowed and interrupted medially, large spots on tegulae and tubercles, anterior knees, stripe on tibiae outwardly and tarsi, outer base of middle tibiae, and basal half of hind tibiae yellow; flagellum beneath, tarsi and margins of abdominal segments brownish, calaria pale. Wings hyaline, the venation brownish.

Clypeus, supraclypeal area, and sides of face longitudinally lineolate or striolate, with shallow, sparse indications of punctures; front and vertex a little shining, strongly and closely punctured; mesonotum opaque.

closely and strongly, a little more finely punctured; mesopleura similar; scutellum a little more sparsely and coarsely punctured; metanotum coarsely chartaceous or rugulose, opaque; area of propodeum with a few rather coarse, irregular reticulations basally, nearly smooth apically, sides with fine sculpture concealed by the fine, scattered pubescence, the posterior face lineolate chartaceous, carinate laterally below.

First tergite highly polished and shining, the second and following a little more obscure from the fine scattered pubescence. Without definitely indicated hair bands and apical margins not noticeably contracted; sternites a little more pubescent and minutely punctate.

A stout, compact species, the head broad, the eyes converging below the pronotum with the anterior margin of the collar rounded, the collar narrowed and subinterrupted in the middle, the recurrent nervures interstitial or nearly so.

♂. Third sternite with a spine on either side the disc and connected by a ridge.

Scape enormously enlarged, the lower side prolonged beyond the insertion of the flagellum, the upper (inner) side more expanded below.

Black, clypeus except a linear lateral border, labrum and mandibles largely, dot on the genae behind base of mandibles, another on the temples a little below the summit of the eyes, sides of face to above the antennae obliquely rounded from near the orbit to the antennae, spot on upper part of supraclypeal area, scape except infuscated longitudinal discal area, pedicel, spot on either side the neck, collar nearly continuous with the tubercles, base of tegulae, knees, tibiae and tarsi except inner apical infuscate areas on tibiae yellow (reddened by cyanide in the material described). The marks on the underside of the head and on the neck absent in ♂ paratype.

Seventh sternite with two very small simple lateral lobes apically. Eighth sternite with a basal process, the apical process nearly straight sides narrowed apically and curved, the apex strongly chitinized and dorso ventrally thickened. Stipites longer than sagittae evenly narrowed on the inner (median) side to apex from base (no distinction of apical and basal parts).

♀ Length 6 mm.; wing 4.5 mm.; ♂ length 4.5 mm.; wing 3 mm.

Described from two females and two males, the former collected at Karuizawa September 1913, the latter merely labelled Japan.

Type, allotype and paratypes in the author's collection.

***Hylaeus Matsumurai* n. sp.**

♀. Edge of collar subcarinate, acute, the pubescence on its posterior edge (relatively) strong and plumose.

Black; sides of face truncate below the lower edge of the antennal socket and acutely produced along the eye margin sometimes above the

upper edge of the antennal sockets, tubercles, basal spot on tegulae, basal half of front tibiae outwardly, basal spot on middle tibiae, and basal half of hind tibiae yellowish; calcaria pale, wings yellowish hyaline, the venation brownish.

Second and following tergites with declined scattered hairs especially on the margins where they simulate hair bands.

Clypeus, supraclypeal area and sides of face longitudinally lineolate, coarsely punctate with shallow punctures, those on the clypeus separated by a little more than the diameter of one, front a little shining, rather coarsely and closely punctured, vertex a little more discretely so. Mesonotum opaque, similarly punctured, punctures separated by a little more than the diameter of one, scutellum a little more shining, similarly punctured; mesopleura a little more deeply and unevenly punctured; area of propodeum strongly reticulate, the ridges very strong, sides of propodeum obliquely punctured more or less separated from the basolateral areas. (which are weakly reticulate) by a Y-shaped carina, which also separates the sides from the posterior face. Sculpture of the posterior face irregular, partly concealed by appressed scattered plumose pubescence.

First tergite smooth and shining, the second and following less shining with scattered minute punctures, second a little contracted at apex; sternites similar to the tergites but the punctures stronger, all the margins a little translucent. A species of the aspect of the *modestus* group. Head about as broad as long, eyes a little convergent below. Recurrent nervures interstitial or nearly so.

♀. Length 7.5 mm.; wing 5.5 mm.

Described from 7 females collected at Karuizawa, September 1913. In the material are three ♀ taken at Okitsu in June, 1913, and one marked Japan which may either represent the same species or another closely allied.

Types and paratypes in the author's collection. Paratypes in the collection of the Hawaiian Sugar Planters' Association.

Named in honor of the eminent entomologist, Shonen Matsumura.

***Hylaeus paulus* n. sp.**

♀. Smaller species, lateral face marks in a line against the orbit reaching about to the level of the summit of the clypeus, tegulae with a yellow spot. Collar more narrowed medially, punctures of the mesonotum shallower.

Black; face marks in the type reduced to a line along the orbits, a spot on the tubercles and tegulae, anterior tibiae with a short basal outward stripe or spot, spot on outer base of middle tibiae and basal 1/3 of hind tibiae yellow, calcaria pale, flagellum pale brownish beneath; apical tarsal joints brownish; wings hyaline, the nervures brownish.

Clypeus, supraclypeal area, and sides of face opaque, irregularly longitudinally lineolate or striolate with indications of sparse, shallow punctures; front and vertex a little shining, finely and strongly discretely punctured; mesonotum similarly but more shallowly punctured, the surface between the punctures tessellate or lineolate; mesopleura similar; scutellum similar, a little more sparsely punctured; metanotum irregularly lineolate and definitely sparsely punctured; area of propodeum strongly reticulate basally more or less chartaceous apically, sides and posterior face shagreened, posterior face angulate at the sides.

First tergite highly polished and shining, with sparse, fine punctures rather regularly disposed; second and following a little less shining from the fine scattered pubescence and a transverse microscopic lineolation. Tergites 1-3 a little contracted at apex and with a slight trace of apical interrupted hair bands. Sternites transversely lineolate tessellate.

A rather elongate little species, the head a little longer than wide, eyes feebly convergent below. The recurrent nervures interstitial or nearly so.

♀. Length 5 mm.; wing 4 mm.

Described from one ♀ specimen collected at Karuizawa September 1913.

Type in the author's collection.

Hylaeus monticola n. sp.

♀. Larger species, the face marks in the type triangular not reaching above the level of the lower margin of the antennal pit and not filling the sides of the face, tegulae black, the punctures of the mesonotum closer and much deeper, the metanotum is rough surfaced and the punctures closer but less evident, the markings of the anterior and middle tibiae are greatly reduced; the sculpture of the propodeal area inclines to be striate, longitudinally carinate, the puncturing of the first tergite is absent and this is microscopically transversely lineolate. The wings are yellowish hyaline. The head is shorter and the eyes more convergent.

♂. Line on the anterior base of mandibles, clypeus except narrow apical line and sutures very finely, sides of face obliquely truncate above from the middle of the supraclypeal area, the upper margin arcuately emarginate opposite the antennal sockets, the angle against the eye margin not reaching above the middle of the antennal sockets, supraclypeal area notched above, stripe on scape in front, small spot on tegulae, suffused spot on anterior femora in front and at the knee, on anterior tibiae in front, spot on middle tibiae on exterior base, basal $3/4$ of middle and hind basitarsi, and basal one-third of hind tibiae sulfur yellow; flagellum pale brownish beneath, tarsi otherwise brownish.

Edeagus, seventh and eighth sternites closely resembling those of *Hylaeus episcopalis* (Cockerell) as figured by Metz and in material which I have determined as that species from my own collection, differing principally from that species by the feebler development of the apical lobe of the seventh sternite. The figure of the edeagus of *H. episcopalis* does not give a good impression of its structure, if my determination is correct. In both that species and *H. monticola* the sagittae are abruptly divergent a little beyond the base and then convergent and each sagitta bears a small lobe at the divergence, its apical limit marked by a notch.

Scape little expanded, arched; second tergite contracted at apex, third more feebly.

♀ Length 7 mm.; wing 5 mm.; ♂ Length 6.5 mm., wing 7 mm.

Described from two ♀ and four ♂ specimens collected at Chiuzenji (4000-5000 ft.) July-August, 1913.

Type, allotype and paratypes in the author's collection.

Hylaeus sp.

♂ Similar, supraclypeal area broader, yellow only along the margins, scape and tubercles black, front basitarsi pale, band on hind tibiae shorter. Edeagus, seventh and eighth sternites much as in the preceding but the apical lobe of seventh sternite more developed and the stem of the process of eighth sternite a little more contracted before the apex. Length 5.5 mm.; wing 4.5 mm.

This male I could not associate with any of the females with any certainty and, since the single specimen (Nikko August, 1913,) did not make the coloration-characters sure, it seemed better to leave it unnamed rather than establish a name in this difficult section of the genus.

There are doubtless many other species of the genus in Japan remaining to be studied.

22. NORTH AMERICAN HYLAEUS.

Metz in his excellent paper on the North American *Protopis* (Tr. Am. Ent. Soc. 37:85-146, 1911) has laid a good foundation for the study of the North American species. He has not, however, had sufficient grasp of the geography of North American entomology and on that account and on account of his attributing too great variability to the species in

regard to sculpture he has fallen into some errors in his account of the species. Crawford has pointed out (Can. Ent. 45:154-156, 1913) his error in sinking *Hylaeus mesillae* (Cockerell) as a variety of the widely distributed *H. Cressoni* (Cockerell). I wish here to make some additional notes and comments.

***Hylaeus basalis* (Smith).**

This is a species of the Boreal and Transition zones and seems to be confined to them. All the specimens I have taken have been from the mountains in California and Oregon. Metz speaks of it as not restricted in its distribution. My localities for it are Oregon: Cascade Mountains,—Detroit, Mt. Jefferson, Three Sisters; Coast Mountains—Benton Co. (J. C. Bridwell). California: Siskiyou Mountains (F. W. Nunenmacher), San Jacinto Mountains (Bridwell).

***Hylaeus Nunenmacheri* n. sp.**

The well-marked *Hylaeus basalis* (Smith) has hitherto remained rather isolated. Metz' *H. potens* only known in the male sex has genital characters similar but is quite different externally from *basalis*. It was with interest that I have discovered mixed with my material of *basalis* a very similar but smaller species.

♀ Clypeus a little broader in proportion more sparsely punctured, the punctures less oblique, the surface less lineolate, particularly apically; sculpture of basal area feebler and its integument more shining. The rugae are confined to a few short weak longitudinal ridges along the anterior margin while there are some reticulations in *basalis*. In both species the integument of the area behind the rugosities is microscopically tessellate but it is shining as seen with a hand lens in *Nunenmacheri*, opaque in *basalis*, due to the greater impression of the lines bounding the tessellations in the latter.

Length 7 mm.; wing 5.5 mm.

♂ Clypeus shorter and broader than in *basalis*. The integument of the area duller than in the ♀ but the rugae similar.

Seventh sternite with the lateral lobes more transverse than in *basalis* the sinus between them less profound, their posterior margin brace-shaped while in *basalis* the posterior sinus is profoundly V-shaped and the sides are rounded off toward the base.

On the 8th sternite the short median apical process is shorter and the sides of the basal part in a straight line with each other, while in *basalis* they gently recede from each other.

Length 7 mm.; wing 4.5 mm.

Two ♀ and one ♂ Siskiyou Co., California, June 2, 1911 (F. W. Nunenmacher); one ♂ Santa Cruz Mountains, Santa Clara Co., Cal., April 25, 1913 (Bridwell).

♂ Type, allotype, and paratypes in the author's collection.

Named in honor of F. W. Nunenmacher, whose remarkable ability as a collector has revealed many new and interesting California and Arizona insects.

Whether the fact that the coastal mountains of California where this species has been discovered were insular during the Tertiaries has anything to do with its evolution from *basalis* remains to be elucidated.

***Hylaeus conspicuus* (Metz).**

Corvallis, Oregon; Benicia, Berkeley, Santa Cruz Co., San Gabriel Mountains, California (Bridwell).

***Hylaeus tridentulus* (Cockerell).**

Mt. Jefferson, Oregon; Coast Mountains, Benton Co., Ore. (Bridwell). Apparently a Transition species.

***Hylaeus varifrons* (Cresson).**

Oregon: Crater Lake (O. H. Swezey), Three Sisters, Mt. Jefferson (J. C. Bridwell).

New Hampshire: Durham (J. C. Bridwell). Another Transition species.

***Hylaeus episcopalis* (Cockerell).**

I am convinced that at least three species of males are confused in Metz' treatment of this species, but I am not yet prepared to assign names for them on account of the involved synonymy.

***Hylaeus maritimus* n. sp.**

♀ Black, elongate spot on the sides of the face obliquely truncate to the eye margin at the level of the middle of the antennal socket, interrupted band on collar not greatly narrowed within, tubercles, spot on the subhyaline tegulae, spots on the outer base of front and middle tibiae, basal third of hind tibiae (band prolonged outwardly) yellow. Flagellum pale brown beneath; margins of tergites and sternites testaceous, subhyaline. Wings brownish subhyaline, venation brownish

Pubescence of head scattered, collar feebly pubescent on its posterior side, plumose pubescence well developed on the posterior angles of the propodeum. Interrupted whitish hair band on posterior margin of first tergite and a thinner and less definite one on second, surface of second and following tergites with fine scattered declinate hairs and some longer and more erect ones.

Supraclypeal area and clypeus longitudinally lineolate, obliquely punctured with piligerous punctures, those of the apical half of the clypeus distant from one to two times the diameter of a puncture, lineolations of the sides of the face obliquely longitudinal, directed to the clypeus, front longitudinally aciculate-punctate, vertex more definitely and discretely punctured, occiput transversely lineolate or minutely rugulose. Mesonotum opaque closely and shallowly punctured, the punctures not separated by one-half the diameter of a puncture; mesopleura more shining, more finely and sparsely punctate, contrasting with the opaque longitudinally rugulose metapleura; scutellum similar to the mesonotum; metanotum more opaque with very shallow almost contiguous punctures; propodeum with the area only fairly well defined, rather coarsely (microscopically) tessellate with a few rugae or reticulations at the base these variable but not much developed, sides and posterior face of propodeum shagreened, posterior face angulate at the sides, not carinate, the basolateral areas not defined.

Tergite one microscopically sparsely punctate, the surface smooth and a little shining, microscopically transversely lineolate, remaining tergites similar but less shining from the pubescence, tergites not perceptibly contracted; sternites similar but with minute punctures.

Head greatly developed longer than broad, inner orbits sinuate, feebly converging below, supraclypeal area but little elevated in the middle and gradually descending to the plane of the front, margins angled between the antennae, the furrow continued feebly to the anterior ocellus, temples broader than the eyes as seen from above, collar with rounded margin a little narrowed medially. Recurrent nervures received by the second cubital cell or the second interstitial.

Length about 6.5 mm.; wing 5 mm

♂ Similar to the female, triangular spot at apex of scape, clypeus, supraclypeal area, sides of face with a clavate extension extending from the lower edge of the antennal socket to above its upper edge; stripe on front tibiae, apical as well as basal spot on middle tibiae, and basi-

tarsi whitish yellow, rest of front tibiae and the tarsi brownish (other pale markings as in ♀).

Eighth sternite similar to that of *H. Cressonii* but the stem shorter and the lobes more developed (as long from the base of their expansion as their stem). Membranous flap of seventh sternite more developed and hairy, the teeth of the other flap fewer and larger, more or less hooked at the end.

Length about 5.5 mm.; wing 4 mm.

Described from 16 ♀ and 1 ♂ taken in the vicinity of Lake Merced in the sand dune district of San Francisco, Cal., 1 ♀ July 17, 1903 (F. E. Blaisdell); remainder August to Sept., 1910, (J. C. Bridwell).

A very distinct species related to *H. conspicuus* (Metz), *Cressonii* (Cockerell) and *rudbeckiae* (Cockerell). The female is distinguishable by the large head and the translucent margins of the abdominal segments while the male may be separated from that of *conspicuus* by the absence of the peculiar flattened impression over the basal portion of the clypeus, lower part of supraclypeal area and adjacent sides of the face; the supraclypeal area is narrower and the scape is less expanded and has far less yellow on it, the white hair bands on tergites 1 and 2 present in *maritimus* and not in *conspicuus*. *H. rudbeckiae* (Cockerell) ♂ is also similar but has the baso-lateral areas of the propodeum well defined by a carina separating them from the posterior face. Both these species which resemble *maritimus* most closely have the eighth sternite quite different, as may be seen from Metz' figures. Apparently *Hylaeus Stephensi* (Crawford) is very close to this in the structure of the hidden sternites but the face markings are quite different in both sexes.

***Hylaeus oregonensis* n. sp.**

I have a form of this genus which is represented in my collection by two ♀ and two ♂ collected in the high Cascade Mountains of Oregon, Mount Jefferson (Bridwell), which seem to differ but little externally from what I have identified as *H. polifolii* except that the reticulations of the propodeal basal area and particularly the basolateral areas are more strongly developed and the clypeus at the summit seems a little broader. I had supposed that this would prove to be *nevadensis*, but

while the examination of the concealed sternites reveal a seventh sternite like that figured by Metz for *nevadensis*, the eighth sternite is indistinguishable from that of his *H. calvus*.

Type ♂, allotype, and paratypes in the author's collection.

***Hylaeus nevadensis* (Cockerell).**

One ♂ collected at Big Lake near Mt. Washington, Oregon (Bridwell) seems certainly this species. The narrow margin of the supraclypeal area is white like the clypeus and sides of the face. This is the case also in some individuals of *H. polifolii*.

***Palaeorrhiza imperialis* (Smith).**

Prosopis imperialis Smith. Jour. Linn. Soc. Zool. 7:44
♀ Dory 1863.

Prosopis malachisis Friese (*nec* Smith). Ann. Mus. Hung.
7:184 ♂ Tenimber Larat 1909.

Palaeorrhiza Muiri Perkins. Ann. Mag. Nat. Hist. (8) 19:
103 ♂ Amboina 1912.

The description of *Prosopis malachisis* Friese ♂ does not mention the carinae on the third nor the angulate second sternite but otherwise agrees perfectly.

One ♂ collected on Amboina July-August 1908 (F. Muir).

It seems likely *Prosopis malachisis* Smith is also a *Palaeorrhiza*.

(?) DIPHAGLOSSIDAE

22. *BINGHAMIELLA ANTIPODES* (Smith).

Sphecodes antipodes Smith. Cat. Hym. Brit. Mus.
1:37 ♀. 1853.

Binghamiella antipodes Cockerell. Bull. Am. Mus. Nat.
Hist. 23:235. 1914.

2 ♀ 3 ♂ Stradbroke I. Moreton Bay, Queensland (J. C. Bridwell), Sept. 20, 1915.

The tongue of this bee is truncate at apex, scarcely emarginate, ciliate at apex, excavated above, the paraglossae about as long, obliquely deltoid,

labial palpi 4-jointed rather stout and short about as long as the tongue, the basal joint longest, apical joints subequal. Apical portion of maxilla ovate, expanded, sinuate or subemarginate within and without near the apex hyaline within, labrum transverse, ciliate anteriorly with 2 short weak median process basally elevated into a ridge, notched medially. Upper inner margin with a narrow fovea.

♀ Antennae with pedicel and flagellar joints 1 & 2 subequal, following joints subequal, a little broader than long to a little longer than broad. Tergites 2 and 3 with a narrow transverse submedian impressed line. Pygidial area strongly narrowed near the base, narrow and truncate at apex, longitudinally, subcarinate medially.

♂ This sex has not previously been described. It is very much like the ♀. The abdomen a little smaller and narrower. Face clothed with coarse silvery hairs as in *Sphecodes*, mandibles with a single subapical tooth within (the ♀ has two), antennae about as long as the head and thorax, scape short and stout, a little longer than the 3d flagellar joint, with silvery plumose hairs outwardly; pedicel and 1st flagellar joints broader than long together about as long as the 2nd flagellar joint, this shorter than third, this and following joints subequal about twice as broad as long, the flagellum more or less nodulose and *Sphecodes*-like.

Tergite 4 has a sub-basal narrow impressed line while 2 and 3 are as in the ♀.

Seventh and eighth sternites concealed and highly modified, the seventh with divergent basal struts, apically membranous and cleft into 2 quadrate lamellae; 8th basally lamelliform apically produced into a dark narrow parallel-sided, strapshaped spine, very slightly expanded apically and rounded.

Cardo well developed about as broad as long, basal portion of stipes short, the median apical angles a little acute, apices nearly straight, the apical half outwardly with rather setose whitish hairs. Sagittae together ovate lanceolate excavated or broadly channeled above, inner margins adjacent in the basal half and then separated in a gentle curve and approximate apically.

The affinities of this genus are clearly with *Paracolletes* and they together diverge from *Colletes* by the presence of the pygidial area. Here too belong several of the genera of bees with emarginate tongues and 2 cubital cells rather than with *Hylaeus*.

DUFOUREIDAE.

23. MIMULAPIS n. gen.

Related to *Halictoides* but with greatly elongated mouth parts and a well developed malar space. Maxilla with the cardo nearly as long as the stipes, lacinia acuminate about two-thirds as long as the stipes, palpi about as long as the stipes, 6-jointed, basal and 2nd joint larger than the remainder, basal about half as long as the second, second a

little longer than either the 3rd or 4th, 5th and 6th successively shorter but elongate; labium with the glossa and palpi about equal in length to the mentum, paraglossae not quite attaining the apex of the first palpal joint, the palpi 4-jointed elongate, first 3 joints flattened, 4th subcylindrical, 2nd joint longest as long as 3rd and 4th together, glossa hairy acuminate, lance-linear.

Wings with two closed cubital cells, the second receiving the recurrent nervures, about $1/5$ its length from either end. Stigma well developed, radial cell lanceolate, pointed on the wing margin, transverse median a little before the basal. Cubital cells subequal on the cubitus, the second narrowed in front, only about $1/3$ as long on the radius as on the cubitus.

Head flattened elongate, mandibles ♀ unidentate within, labrum free large, not twice as long as broad, clypeus strongly produced, malar space $2/3$ as long as wide, genae very narrow, occiput well developed, wider than the width of the eye.

Collar sloping in front not narrowed medially. Scutellum simple, propodeal area well defined, propodeum rounded abruptly down to the posterior face which is not carinate laterally.

Claws unequally cleft. Hind tibiae of female flattened with a stiff scopa on both sides, broader than the basitarsus, Legs of male more or less deformed.

♀ Antennae short, clavate only the terminal segment of the flagellum as long as broad, second and third flagellar joints ringlike, forming, with the first, a sort of funicle which tapers from the 6-jointed club. ♂ Antennae deformed, segments 1-4 of the flagellum forming a bulb-shaped structure emarginate beneath and this strongly concave under surface with a dense brush of short stiff erect brown hairs, sixth abdominal segment ♀ retracted. ♂ Abdomen deformed, last tergite with a longitudinal median area.

Type *Mimulapis versatilis* Bridwell.

***Mimulapis versatilis* n. sp.**

Black with some chalybaeus reflections on head, thorax and abdomen above. Mandibles more or less piceous, legs and antennae brownish, tergites with the depressed margins broadly and the sternites more narrowly brownish translucent.

Rather loosely pubescent with whitish pubescence which becomes brownish or fulvous on the mandibles, labrum, clypeus, mesonotum, tibiae in part, tarsi, venter and tergites 3-5.

Clypeus convex with a few coarse scattered punctures, a fine furrow extends from between the antennae a little more than half the distance to the anterior ocellus, front and vertex closely and strongly punctured, the punctures confluent on the occiput. Mesonotum similarly punctured, the furrows well defined; scutellum more sparsely punctured shining; metanotum shagreened; area of propodeum irregularly longitudinally striate basally, with a few transverse striae apically; mesopleurae more

or less irregularly punctured, smooth in part, tumid, sides and posterior face of propodeum finely shagreened, its basolateral area (undefined) finely punctate.

Abdomen ♀ ovate, 1st tergite with the surface punctate except the translucent depressed margin but not closely nor coarsely; remaining tergites with the surface obscured by oblique fine piliferous punctures and the declined hairs from them, sternites with the piliferous punctures stronger. Abdomen ♂ more elongate, tergites 1 and 2 more strongly punctate, the translucent margins of the tergites narrower, tergite 7 with a flat narrow brown longitudinal smooth area extending its entire length. Sternites 2-4 more or less emarginately depressed posteriorly, the 4th with a triangular flattened reversed tooth on either side, 5th depressed shining, arcuately emarginate behind, sixth retracted, the basal portion with a broad median longitudinal channel and fulvous hairs on either side, with an oval apical process bearing a blunt spine on its ventral side just before the apex.

The ♂ has the legs more incrassate, the anterior claws large and evenly cleft, the anterior tibiae produced into a curved flattened apical spine in the axis of the tibia, the middle tibiae are greatly subtriangularly incrassate in the middle with a much greater flattened spinous process at the end which bears a brush of peculiar hairs a little before the apex, its basitarsus expanded apically, the 3 median tarsal joints cordate (in all the tarsi), the hind tibiae widest a little beyond the middle within and bear on the inner surface beyond, (as also the basitarsi), long shining white hairs.

♂ Mandibles elongate, acute, the tooth reduced, bearing a tuft of white hairs at base. Antennae beyond the basal bulb with depressed areas, truncate at the end.

♂ Seventh sternite developed into two elongate apical parallel membranous lobes separated by a narrow slit, with sparse whitish hairs apically, bent at the base of the slit and narrowed apically to a blunt point, with two basal struts much as in *Hylaeus*; 8th sternite with a subquadrate basal piece and an apical elongate median process strongly chitinized, irregularly prismatic with four sides, with a gentle dorso-ventral sigmoid curve, produced about as far as the width of the basal piece, with two broad basal struts not so long as the apical process, parallel separated from each other by a slit nearly as broad as each strut.

Edeagus with the cardo transverse twice as broad as long a little produced medially, the stipes with the inner angle sub-basal, the outer side sinuously emarginate near the base of the sagittae, with a slender curved apical process arising near the apex of the sagittae; sagittae strongly geniculate near the base, their inner margin notched at base and then somewhat expanded, their main mass lying above the plane of the stipes and cardo, but their tips deflexed below the end of the stipes.

♀ Length 8 mm.; wing 5.5 mm.; ♂ length 9 mm.; wing 5.5 mm.

Described from 4 ♀ and 8 ♂ collected in the Boreal regions of Mt. San Jacinto, Calif., at elevations of 7500-9000 ft., visiting the flowers of different species of *Mimulus*. July, 1912 (Bridwell). The flowers were of two types, one with an open throat into which the bees entered directly, while in those of the other type with the closed throat they entered sidewise on either side of the gibbous portion closing the throat.

Type ♀, allotype and paratypes in the author's collection.

24. ADDENDUM ON AFRICAN HYLAEIDAE.

Nothylaeus Bevisi (Cockerell).

Prosopis Bevisi (Cockerell).

Ann. Durban Mus. 2:45 ♂, Natal, 1917.

Nothylaeus rubriplagiata (Cameron).

Professor Cockerell (l.c.) reports that Dr. Brauns considers *Braunsi* Alfken as synonymous with this species. Alfken has quoted Dr. Brauns as considering it identical with *N. heraldicus* Smith.

With the literature at hand I have been unable to make certain whether *N. rufipedoides* or *Junodi* has precedence.

Prosopis pernix, *sandracata*, and *gracilis* Bingham and *P. quadrilineata* and *quinquelineata* Cameron are species of *Allodape*; as has been pointed out by Meade-Waldo and Alfken.

**Descriptions of New Species of Hymenopterous Parasites of
Musoid Diptera with Notes on their Habits.**

BY JOHN COLBURN BRIDWELL.

The Musoid Diptera play so large a part in the economic entomology of the Hawaiian Islands that any contribution to our knowledge of their enemies has its value. The injuries to fruits by *Ceratitis capitata*, to vegetables by *Bactrocera cucurbitae*, to meats by certain of the *Sarcophaga* species and the annoyance and disease transmission by the house fly; the injury to cattle by *Stomoxys calcitrans* and by *Haematobia serrata*; the benefits in checking the seeding of the lantana by the *Agromyzid* seed fly; the reduction to harmlessness of the cane borer (*Rhabdocnemis obscura*) by *Ceromasia sphenophori* and the beneficial effects of the attacks of other Tachinidae upon Lepidoptera make it desirable to extend our knowledge of their enemies, particularly since efforts have been made in the past and will doubtless be made in the future to control the worst of the pests through the importation of their enemies. Farther afield are the problems of the cherry, apple and currant fruit flies, the root maggots, the sheep maggots and the screw worms all of which at least suggest the consideration of methods of natural control.

So far as I can learn there are no known hymenopterous parasites of the eggs of Musoid Diptera. Their enemies aside from predators appear to attack them in either the pupal or larval stages. Several Pteromalids, Chalcidids and Ichneumonoids are known to attack them only in the puparium. For the practical purpose of parasitic introduction, this group of their enemies have seemed of little importance for two reasons: 1st, because they exercise little or no discrimination in their choice of host and, 2d, because the puparia which they attack are hidden away from them and require to be searched for and found, a time consuming operation which